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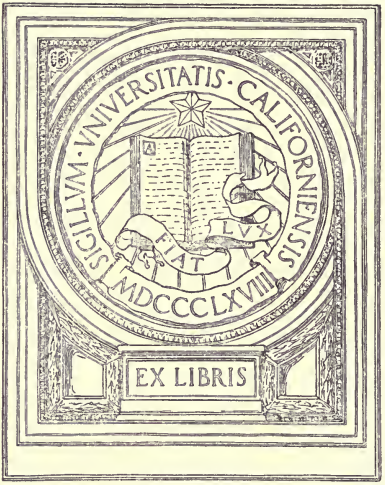


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THE

# MUSCI AND HEPATICÆ

OF THE

## UNITED STATES

EAST OF THE MISSISSIPPI RIVER.

CONTRIBUTED TO THE SECOND EDITION OF

GRAY'S MANUAL OF BOTANY,

BY

WILLIAM S. SULLIVANT.

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**WITH EIGHT COPPER-PLATES,**
ILLUSTRATING THE GENERA.

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The following pages are designed to contain brief descriptions of all the Musci and Hepaticæ hitherto detected in that portion of the United States lying east of the Mississippi River. A few species found elsewhere, either new, or having a geographical range hertofore unnoticed, or for some other special reason, have also been described; namely, those from Texas and New Mexico, and also several from near our northern boundary, and likely to occur within it.

The territory within the limits adopted—extending, as it does, from 25° to 47° North Latitude, and traversed for nearly its entire length by mountain ranges, reaching, at several points in their northern and southern terminations, an alpine elevation—presents conditions favorable to a copious and varied muscological vegetation. And if the number of species here recorded is not so large as that found in an equal area similarly situated on the Eastern Continent, it must be borne in mind that our Bryology and Hepaticology (particularly the latter) have thus far been very imperfectly investigated. Scarcely any portion of our country, excepting Central Ohio, has been carefully examined. The mountain ranges have only been cursorily visited by a few interested in these branches of Botany. In the northern section, notwithstanding numerous discoveries made by the late Mr. Oakes, and the more recent ones (among them a *Dichelyma* a *Tetrodontium*, and

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an *Atrichum*) by Thomas P. James, Esq., there will doubtless yet be detected many other well-known European species, not a few of which have already been collected in British America by Drummond.

The southern section has been even less carefully explored, and offers a promising field for future discoveries. Among the recent accessions to our Flora from this quarter are an *Orthotrichum*, a *Fissidens*, and several *Bruchiæ* and *Fabroniæ*, gathered by H. W. Ravenel, Esq.; also some fine *Sphagna*, an *Anomodon*, a *Fontinalis*, and a *Macromitrium*, brought thence by our friend, the excellent bryologist, M. Leo Lesquereux.

No portion of our territory has contributed so little to our Bryology and Hepaticology as the Florida peninsula, which in this respect still remains almost a *terra incognita:* its only known species, *Pilotrichum cymbifolium*, like *Meteorium pendulum* from Western Louisiana (whence novelties may also be expected), is thoroughly tropical in all its characters, and gives promise of new and interesting forms to reward future explorers.

W. S. S.

Columbus, Ohio, *July*, 1856.

# MUSCI AND HEPATICÆ

OF THE

# UNITED STATES

EAST OF THE MISSISSIPPI.

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## Order 139. MÚSCI. (Mosses.*)

Low, tufted plants, always with a stem and distinct (sessile) leaves, producing spore-cases which open by a terminal lid (except in Nos. 1–4), and contain simple spores alone. Reproductive organs of two kinds:† 1. The sterile (*male*) flower, consisting of numerous (4–20) minute cylindrical sacs (*antheridia*) which discharge from their apex a mucous fluid filled with oval particles, and then perish. 2. The fertile flower composed of numerous (4–20) flask-like bodies (*archegonia, pistillidia*), each having a membranous covering (*calyptra*), terminated by a long cylindrical funnel-mouthed tube (*style*). The ripened archegonium (seldom more than one in a flower maturing) becomes the *capsule*, which is rarely indehiscent or splitting by 4 longitudinal slits, but usually opens by a lid (*operculum*): beneath the operculum, and arising from the mouth of the capsule, are commonly 1 or 2 rows of rigid processes (collectively the *peristome*) which are always some multiple of four: those of the outer row are called *teeth;* those of the inner row, *cilia*, their intermediate smaller processes, *ciliolæ*. An elastic ring of cells (*annulus*) lies between the rim of the capsule and operculum. The powdery particles filling the capsule are *spores* or *sporules*. The thread-like stalk (*pedicel*) supporting the capsule is inserted into the elongated torus (*vaginula*) of the flower. The pedicel continued through the capsule forms the *columella;* when enlarged uniformly under the capsule, it forms an *apophysis;* when protuberant on one side only, a *struma*. The calyptra separating early at its base is carried up on the apex of the capsule; if it splits on one side it is hood-shaped or *cuculliform*, if not, it is mitre-shaped or *mitriform*. Intermixed with the reproductive organs are cellular jointed filaments (*paraphyses*). The leaves surrounding the antheridia are called the *perigonial* leaves; those around the archegonium or pedicel, the *perichætial* leaves.

## Artificial Analysis of the Genera.

### I. ACROCARPI. Fruit terminal.

**A.** Capsule without a deciduous operculum.

* Capsule dehiscing by irregular ruptures.

3 ARCHIDIUM. Calyptra torn irregularly at the middle.
5. BRUCHIA. Calyptra circumcissile at the base. Capsule apophysate.
4. PHASCUM. Calyptra circumcissile at the base. Capsule not apophysate.

* * Capsule dehiscing by 4 longitudinal slits.

2. ANDRÆA. Capsule sessile on a pedicellate vaginula.

**B.** Capsule dehiscing by a deciduous operculum.

* Mouth of the capsule naked.

+- Capsule sessile on a pedicellate vaginula.

1. SPHAGNUM. Calyptra irregularly torn, persistent.

+- +- Capsule on a proper pedicel: vaginula not pedicellate.

6. GYMNOSTOMUM. Calyptra cuculliform. Antheridia terminal.
25. POTTIA. Calyptra cuculliform. Antheridia axillary.
56. APHANORHEGMA. Calyptra mitriform. Antheridia axillary.
55. PHYSCOMITRIUM. Calyptra mitriform. Antheridia terminal.
40. HEDWIGIA. Calyptra conic. Antheridia axillary.

* * Mouth of the capsule furnished with teeth.

+- Peristome single.

++ Teeth of the peristome 4.

26. TETRAPHIS. Calyptra mitriform. Plants with a conspicuous stem.
27. TETRODONTIUM. Calyptra dimidiate-mitriform. Almost stemless plants.

++ ++ Teeth of the peristome 16. Calyptra mitriform.

*a.* Calyptra plicate.

35. PTYCHOMITRIUM. Teeth deeply bifid; their segments adherent.
38. COSCINODON. Teeth cribrose.

*b.* Calyptra not plicate.

37. GRIMMIA. Teeth entire, cribrose or 2–3 cleft at the apex.
36. SCHISTIDIUM. Teeth as in No. 37 Columella adherent to the operculum.
39. RACOMITRIUM. Teeth filiform, 2–3-cleft to the base.
57. SPLACHNUM. Teeth in pairs, reflexed when dry.
18. CONOMITRIUM. Teeth truncate, very short, more or less perforated.

++ ++ ++ Teeth of the peristome 16. Calyptra cuculliform.

*a.* Leaves 2-ranked.

17. FISSIDENS. Teeth cloven half-way into two unequal segments.
24. EUSTICHIUM. Fruit unknown.
23. DISTICHIUM. Teeth usually entire; if cloven, their segments equal.

*b.* Leaves spreading every way.

1. Capsule cernuous-inclined, unequal.

14. DICRANUM. Teeth as in Fissidens Leaves furnished with a costa.
16 LEUCOBRYUM. Teeth as in Fissidens Leaves destitute of a costa.
15. CERATODON. Teeth deeply bifid. Capsule with a short struma.
12. TREMATODON. Teeth cleft below. Capsule with a long and linear apophysis.
52. CONOSTOMUM. Teeth united at the apex. Capsule ribbed.

2. Capsule somewhat pendulous on an arcuate pedicel, equal.

13. CAMPYLOPUS. Teeth deeply bifid. Calyptra fringed at the base.
11. DICRANODONTIUM. Teeth deeply bifid. Calyptra not fringed at the base.

3. Capsule erect, oval or somewhat pyriform.

9. SELIGERIA. Teeth lanceolate, obtuse. Capsule globose-pyriform.
7. WEISIA. Teeth lanceolate, acute. Capsule oval, smooth.
8. RHABDOWEISIA. Teeth subulate. Capsule oval, striated.
10. ARCTOA. Teeth split half-way down. Capsule somewhat turbinate, striated.
31. DRUMMONDIA. Teeth truncate, erect. Capsule globose-oval.
54. ENTOSTHODON. Teeth lanceolate, horizontal. Capsule globose-pyriform.

4. Capsule erect, oblong or cylindrical.

21. DESMATODON. Teeth deeply bifid, erect. Operculum elongated-conic, obtuse.
29. SYRRHOPODON. Teeth entire, horizontal. Operculum subulate-rostrate.
58. TETRAPLODON. Teeth in fours, reflexed when dry. Operculum conico-convex.

↔ ↔ ↔ ↔ Teeth of the peristome 32. Calyptra cuculliform.

19. TRICHOSTOMUM. Teeth more or less united in pairs, with a narrow basilar membrane.
22 DIDYMODON. Teeth as in the last, but without any basilar membrane.
20. BARBULA. Teeth very long, once or twice twisted around the columella.
43. ATRICHUM. Teeth adherent by their points to the flattened top of the columella. Calyptra spinulose at the apex.
44. POGONATUM. Teeth as in the last. Calyptra densely hairy.

↔ ↔ ↔ ↔ ↔ Teeth of the peristome 64. Calyptra cuculliform.

45. POLYTRICHUM. Teeth adherent as in No. 43 Calyptra densely hairy.

← ← Peristome double; its teeth 16.

↔ Capsule symmetrical, erect: inner peristome of 16 cilia.

33. MACROMITRIUM. Teeth when dry erect. Calyptra campanulate, plicate.
28. ENCALYPTA. Teeth when dry erect. Calyptra campanulate, not plicate.
34 SCHLOTHEIMIA. Teeth when dry revolute. Calyptra campanulate, not plicate.
32. ORTHOTRICHUM. Teeth when dry reflexed Calyptra campanulate, plicate.
30. ZYGODON. Teeth when dry reflexed. Calyptra cuculliform.

↔ ↔ Capsule unsymmetrical and inclined to one side.

= Inner peristome a plaited cone.

41. BUXBAUMIA. Capsule gibbous, ovate, plano-convex, pedicellate.
42. DIPHYSCIUM. Capsule gibbous, ovate, not plano-convex, sessile.

= = Inner peristome a membrane cut into 16 cilia.

51. BARTRAMIA. Capsule globose, ribbed when dry.
47. AULACOMNION. Capsule oblong, ribbed when dry.
49. MNIUM. Capsule oblong: male flower discoid.
48. BRYUM. Capsule elongated-pyriform: male flower gemmiform.
50. MEESIA. Capsule elongated-pyriform. The outer peristome the shortest.
53. FUNARIA. Capsule short-pyriform. Teeth oblique, united at the apex.

= = = Inner peristome a membrane cut into 64 cilia.

46. TIMMIA. Capsule obovate-oblong. Cilia united at their apex in fours.

## II. PLEUROCARPI. Fruit lateral (with operculum and peristome).

A. Calyptra cuculliform.

* Peristome single: teeth 16.

67. CLASMATODON. Teeth irregular twice or thrice divided to the base. Annulus large, imperfect.
70. FABRONIA. Teeth regular, approximated in pairs. Annulus wanting.

* * Peristome double: the outer of 16 teeth; the inner of 16 cilia, with or without ciliolæ; or an irregular membrane.

← Capsule erect, equal.

*a.* Leaves papillose.

69. MYURELLA. Cilia from a broad base: ciliolæ present. Foliage glaucous-green.
66. LESKEA. Cilia from a broad base: ciliolæ none. Foliage dark-green.

65. ANOMODON. Cilia from a narrow base. Foliage yellowish green.
68. THELIA. Cilia obsolete; a broad annular membrane present. Foliage glaucous-green.

*b.* Leaves not papillose, complanate.

76. NECKERA. Cilia from a narrow base. Leaves undulate.
75. CYLINDROTHECIUM. Cilia from a narrow base. Leaves smooth
77. OMALIA. Cilia from a broad base: ciliolæ present.

*c.* Leaves not complanate.

= Inner peristome a membrane adherent to the teeth.

62. LEUCODON. Perichæth very long. Calyptra smooth.
63. LEPTODON. Perichæth very long. Calyptra hairy.
72. PYLAISÆA. Perichæth short. Calyptra smooth.

= = Inner peristome free, divided to the base into 16 cilia.

71. ANACAMPTODON. Teeth of the peristome reflexed when dry.
74. PLATYGYRIUM. Teeth of the peristome broadly margined. Annulus large.
64 ANTITRICHIA. Perichæth long. Ramification pinnate. Pedicels flexuose.
79. CLIMACIUM. Perichæth long. Ramification dendroid. Columella exserted.
60. DICHELYMA. Perichæth long. Inner peristome as in Fontinalis, No. 59.

+- +- Capsule inclined, unequal.

73. HOMALOTHECIUM. Inner peristome a membrane adherent to the teeth. Calyptra hairy
80. HYPNUM. Inner peristome a plicate membrane divided half-way into carinate cilia: ciliolæ present. Calyptra smooth.

**B.** Calyptra mitriform. Peristome double; its teeth 16.

* Capsule immersed, erect.

59. FONTINALIS. Inner peristome of 16 cilia connected by cross-bars.
61 CRYPHÆA. Inner peristome of 16 free and subulate cilia.

* * Capsule exserted, horizontal.

78. HOOKERIA. Inner peristome of 16 carinate cilia: ciliolæ absent.

## Suborder I. SPHÁGNACEÆ.

### 1. SPHÁGNUM, Dill. Peat-Moss. (Tab. 15.)

Calyptra irregularly ruptured in the middle. Operculum convex, depressed. Capsule subglobose, sessile on the pedicellate vaginula. Peristome none. Inflorescence monœcious or dicœcious: antheridia roundish, with a long pedicel, lodged singly in the axils of the perigonial leaves at the clavate extremities of short branches. — Large, soft, flaccid, and usually pale-colored plants, inhabiting bogs and swampy places; stems erect, mostly simple, capitate at the summit by the crowded branches which elsewhere are (3 – 7 together) in distinct fascicles; branch-leaves 5-ranked, between broad-ovate and linear-lanceolate, convolute-concave, with a peculiar reticulation, composed of two kinds of cellules, one kind (utricles) large, sub-fusiform, colorless, perforated, and lined with a spiral filament (fibrillose), except in No. 10; the other kind (ducts) much smaller, linear, chlorophyllose, running between the contiguous walls of the utricles and forming the angular-serpentine network. (Σφάγνος, the ancient name.) Cross-sections of the leaf (see Sulliv. in Mem. Amer. Acad. IV. p. 174. t. 4. B.), showing the form and relative position of the utricles and ducts, are of service in determining the species, as follows: —

* *Ducts somewhat elliptical, situated centrally between the angular-rotund utricles and not extending to either surface of the leaf.*

1. **S. cymbifòlium,** Dill. Dicœcious; stems robust, 6′–18′ long; branches 4–6 in a fascicle, tumid, mostly obtuse; stem-leaves spatulate, not fibrillose; branch-leaves imbricated, ovate, cucullate and entire at the apex; capsule with stomata in its wall. — Bogs, &c.; common. — A large species, distinguished from its congeners by the sharp papillæ on the back of the leaf near the apex, and by the striæ on the walls of the cortical utricles of the branches. (Tab. I.) (Eu.)

2. **S. compáctum,** Brid. Dicœcious? stems erect, 2′–5′ high, densely cæspitose, with one layer of cortical utricles; branches 2–3 in a fascicle, short, crowded, erect; branch-leaves ovate-acuminate, recurved-spreading, broadly margined, truncate and toothed at the apex; utricles with small pores, those at the point of the narrowly acuminated perichætial leaves not fibrillose. — (S. strictum, *Musc. Alleghan.*, No. 201.) — Springy places on high mountains, Southern States, *Lesquereux, Curtis, Buckley.* (Eu.)

3. **S. contórtum,** Schultz. Somewhat stiff and dark-colored; stems 4′–6′ high; branches attenuated, more or less contorted; branch-leaves rather secund, ovate-lanceolate, of a firm texture; utricles very narrow, with a row of small pores on each side. — Cranberry marshes, Northern Ohio, *Lesquereux.* (Eu.)

4. **S. Lescùrii,** Sulliv. (Musc. Bor.-Amer., No. 6.) Aspect same as that of small forms of No. 1; ramification and mode of growth loose; branches 2–3 in a fascicle, distant; stem-leaves lingulate, obtuse, the utricles fibrillose; branch-leaves elongated-ovate, truncate and dentate at the apex, the ducts cuneiform-elliptic, approaching the convex surface of the leaf; perichætial leaves quite large, when flattened oval-ovate; capsule oblong-globose, blackish, much exserted. — Wet sandy places among the mountains of Alabama; also Dismal Swamp, Virginia, *Lesquereux.*

5. **S. tènerum,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 11.) Stems 2′–3′ high, cæspitose; branches crowded, deflexed; stem-leaves large, ovate-lanceolate, the utricles fibrillose; branch-leaves ovate-lanceolate, imbricated; utricles ample, with a few large pores; ducts nearly cuneiform-elliptic, approaching the concave surface of the leaf; perichætial leaves ovate-subulate, undulate on the convolute margins above, the utricles mostly not fibrillose; capsule scarcely emergent. — Margins of rivulets; Raccoon Mountains, Alabama, *Lesquereux.*

6. **S. hùmile,** Schimper. Cæspitose; stems 1′–2′ high, with 3 layers of cortical utricles; branches crowded, spreading, 2–3 in a fascicle; branch-leaves ovate-lanceolate, the upper half horizontal, truncate and dentate at the apex, narrowly margined; utricles broad, with large pores. — Tallahassee, Florida, *Rugel:* among the Lookout Mountains, Alabama, *Lesquereux.*

7. **S. cyclophýllum,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 5.) Stems 2′–3′ long, thick, turgid, flaccid, with only one layer of cortical utricles, mostly simple, rarely with a few scattered branches, not in fascicles; leaves pale greenish-white, narrowly margined, somewhat constricted at base, closely imbricated, oblong-rotund, entire at apex; ducts as in No. 5; flowers and fruit unknown. (S. cymbifolium, var. turgidum, *Hook. & Wils. in Drum. 2d Coll. No. 17.*) — New Orleans, *Drummond:* mountains of Alabama, *Lesquereux.* — (This

and No. 8 may be sterile forms or incomplete states of two species yet unknown. They approach nearer to S. cymbifolium than to any other species; but their leaves have a closer reticulation, and are not papillose on the back near the apex, nor are the cortical utricles of the branches marked with striæ, as they are in the last-named species.)

8. **S. sedoïdes,** Brid. Form and ramification of the stem and cross-section of the leaf same as in the last, but a somewhat smaller plant, and not so flaccid; leaves mostly of a dark vinous red, oval, entire at the apex, not margined; when dry absorbing moisture with difficulty; flowers and fruit not seen — Springy places, on Table Rock, S. Carolina, *Gray, Lesquereux:* Mt. Marcy, New York, *Torrey.* — (In the first-mentioned locality occurs an olive-green variety, (?) — perhaps S. Pylæsii, *Brid.* — smaller in all its parts; branches somewhat numerous, short, mostly single, and with closely-imbricated leaves, much smaller than the distantly placed stem-leaves. — (Musc. Bor.-Amer., No. 4.)

* * *Ducts oval, situated centrally between the rotund utricles, and extending to both surfaces of the leaf.*

9. **S. squarròsum,** Pers. Monœcious; stems 8′–12′ long, robust, rigid; branches deflexed, attenuated, 5 in a fascicle; branch-leaves ovate-acuminate, squarrose; stem and perichætial leaves oblong, obtuse, not fibrillose. — Bogs, &c.; common in the Northern and Middle States, and westward. — A large species. (Eu.)

10. **S. macrophýllum,** Bernhardi. Stems slender, stiff, reddish, 4′–6′ long; branches short, flat, flabelliform, 2–3 in a fascicle; branch-leaves long, subulate, straight, spreading, dentate at the apex; utricles elongated, with 7–9 large pores in a line along the centre, and remarkable for the absence of a spiral fibre; capsule oblong, concealed by the perichætial leaves. — Swamps near the sea-coast, New Jersey to Florida: also Raccoon Mts., Alabama, *Lesquereux.*

* * * *Ducts triangular, situated between the rotund utricles next the concave surface of the leaf.*

11. **S. acutifòlium,** Ehrh. Monœcious; stems 5′–10′ long, slender; branches crowded, elongated, attenuated, mostly pendent; stem-leaves lingulate, obtuse, not fibrillose; branch-leaves ovate-lanceolate, tapering to a narrow truncate point, erect-patent; capsule much exserted. — Frequent; variable in size: foliage often tinged with red. — S. rubellum, *Wils.* (common in Europe), closely resembling this, but a smaller species, with elliptical leaves and dicœcious inflorescence, may be looked for within our limits. (Eu.)

12. **S. fimbriàtum,** Wils. Monœcious; much like and formerly confounded with No. 11, but a more delicate species, with fimbriated stem-leaves, and large, conspicuous, obovate, obtuse, and cucullate perichætial leaves. — British America, *Drummond.* (Eu.)

13. **S. tabulàre,** Sulliv. Stems 2′–3′ high, closely cæspitose; branches densely crowded, short, erect-patent; stem-leaves large, oblong, obtuse or acute, fibrillose; branch-leaves ovate-acuminate, the upper half spreading and undulate on the margins; perichætial leaves lanceolate, acute, broadly bordered above; sporules golden-yellow. — (S. acutifolium, var.? *Musc. Alleghan.*) — Table

Mountain, N. Carolina; near Mobile, Alabama. — A small species, with foliage mostly of a pale brownish or yellowish hue, resembling S. molluscum, but that has a cross-section of the leaf like No. 15 and 16.

14. **S. mólle,** Sulliv. Densely cæspitose; stems 2′–3′ high, fragile, concealed by the crowded and short patent branches; branch-leaves oblong, ovate-acuminate, recurved-spreading; perichætial leaves orbicular-ovate. — Mountains of N. Carolina, *Gray:* Tallulah Falls, Georgia, *Lesquereux.* — Has remarkably soft whitish foliage.

* * * * *Ducts triangular, situated between the rotund utricles next the convex surface of the leaf.*

15. **S. cuspidàtum,** Ehrh. Monœcious; stems 6′–10′ long; fascicles of 4–5 deflexed branches distant; stem-leaves lanceolate-acuminate, recurved-patent, when dry flattened and undulate on the margins (the best distinctive mark of the species); perichætial leaves broad-ovate, acute. — Var. RECÚRVUM, leaves oblong-lanceolate, when dry much recurved. — Var. PLUMÒSUM, growing in water, more elongated and attenuated in all its parts. — Not uncommon; New England to Louisiana. Foliage pale green or yellowish-white. (Eu.)

16. **S. Torreyànum,** Sulliv. Stem stiff, a foot or more in length; branches 4–5 in a fascicle, 12″–15″ long, 2″–3″ wide, flat, linear-lanceolate; leaves elongated-lanceolate, spreading, straight, broadly margined, erose-dentate at the apex; fruit unknown. — Ponds and slow-flowing streams; pine barrens of New Jersey, *Torrey.* — A large robust species: foliage drab-colored, of a firm texture.

## SUBORDER II. ANDRÆÀCEÆ.

### 2. ANDRÆ̀A, Ehrh. (Tab. 15.)

Calyptra mitriform. Operculum none. Capsule oblong-oval, dehiscing by four longitudinal fissures, and sessile upon the pedicellate vaginula. Inflorescence monœcious or diœcious. — Small alpine or subalpine mosses, of a dark brownish or blackish color, growing on rocks; stems ascending, rigid, dichotomously divided; leaves with or without a costa, of a firm texture, the areolation above angular-rotund and small; below oblong and large. — (A personal name.)

1. **A. petróphila,** Ehrh. Monœcions; stems 4″–10″ long, filiform, leafless below; leaves ovate- and oblong-lanceolate, concave, spreading-incurved from an erect base, without a costa, papillose on the back, the point oblique, often with a hyaline crenulate margin. (A. rupestris, *Hedw.*) — High mountains; a variable species. (Eu.)

2. **A. rupéstris,** Turner. Monœcious; leaves spreading or secund from an ovate base, linear-lanceolate, smooth, concave; costa continuous. (A. Rothii, *Web. & Mohr.*) — White Mts., New Hampshire, *Oakes.* (Tab. 15.) (Eu.)

3. **A. crassinérvia,** Bruch. Monœcious; near the last, but the leaves are shining, falcate-secund, subulate from an oblong base, cuspidate by the large, terete, excurrent costa, which is papillose at the point. — With No. 2. (Eu.)

## Suborder III. **BRYÀCEÆ.**

### Div. I. **Acrocárpi.**

Fruit terminal on the main stem, or rarely terminal on short lateral branches.

**A.** CLEISTOCÁRPI. — Capsule without an operculum, rupturing irregularly.

### Tribe I. PHÁSCEÆ.

#### 3. **ARCHÍDIUM,** Brid. (Tab. 15.)

Calyptra irregularly ruptured in the middle; the lower part persistent. Capsule globose, sessile on the short vaginula, immersed. Columella none. Spores large, few (8–15). Inflorescence monœcious: male flower naked or 2-leaved, axillary. — Minute terrestrial plants, of a structure more simple than any of the suborder, hence its name (Ἀρχίδιον, *a beginning*).

1. **A. Ohioénse,** Schimp. Stems at first erect, 1″–2″ high, afterwards decumbent, and lengthened by innovations; leaves lanceolate, cuspidate by the excurrent costa, slightly denticulate above, the perichætial much larger; capsule terminal on a short lateral branch. (A. phascoides, *Musc. Alleghan., No.* 213.) — Meadows and waste fields, Central Ohio, and N. Alabama. (Tab. 15.)

#### 4. **PHÁSCUM,** L. (Tab. 15.)

Calyptra campanulate or cuculliform. Capsule roundish, more or less apiculate, shortly pedicellate, usually immersed. Columella present. Spores numerous, muriculate: inflorescence monœcious. — Diminutive species, mostly annual, growing on the ground, either stemless and bulb-like, or with a short stem, sparingly divided; leaves costate or ecostate. (Φάσκον, an ancient name for a moss.) — For convenience, the genus is here retained in its former extended sense; the names of the genera, into which a natural arrangement requires the species to be distributed, being used for sections.

* *Plants growing from a confervoid thallus. Columella fugacious.*

§ 1. EPHEMÉRUM, Hampe. — *Stemless: leaves of a loose rhomboidal areolation. calyptra campanulate-conic: capsule globose-ovate, subsessile, apiculate: spores large: male flower gemmiform, at or near the base of the fertile stem.*

1. **P. serràtum,** Schreb. Leaves oblong or linear-lanceolate, ecostate, deeply serrate; capsule purple, shining. — Moist ground; edge of woods. (Eu.)

2. **P. séssile,** Br. & Sch. Leaves lanceolate-subulate, nearly entire; costa excurrent, more or less obsolete near the base. — Clayey soil, in thin woods, Central Ohio. (Eu.)

3. **P. crassinérvium,** Schwægr. Leaves linear-lanceolate, strongly and irregularly dentate near the apex; costa continuous, not excurrent. — With the last. — Also with a var. ? having the leaves near the apex spinulose-dentate, (the teeth often recurved,) and papillose or cristate on the back; spores much larger: — probably E. spinulosum, *Br. & Sch.*, mentioned in *Wils. Bryol. Brit.*, p. 27.

4. **P. cohærens,** Hedw. Leaves oblong-lanceolate, strongly serrate; costa vanishing below the apex; capsule brownish-purple. — River-banks, Central Ohio. (Eu.)

* * *Plants without a confervoid thallus. Columella persistent.*

§ 2. PHYSCOMITRÉLLA, Schimp. — *Caulescent: leaves loosely areolated: calyptra campanulate-conic: capsule globose, apiculate: antheridia naked, axillary, with paraphyses globosely distended at the apex.* (Closely allied to Aphanorhegma among Funarieæ.)

5. **P. pàtens,** Hedw. Leaves subspatulate-lanceolate, serrate, costate nearly to the apex; capsule sometimes exserted. — Moist clayey soil, Central Ohio: rare. (Eu.)

§ 3. ACAÙLON, Mull. — *Stemless, bulb-like: leaves broad-ovate or obovate, very concave, recurved at the apex, with a lax areolation: capsule globose, entirely concealed by the 2 or 3 large subcucullate perichætial leaves: calyptra minute, campanulate: inflorescence as in § 1.*

6. **P. triquètrum,** Spruce. Leaves 3-ranked, carinate-concave, shortly cuspidate by the continuous excurrent costa, the perichætial ones 3 and larger; capsule horizontal, with a curved pedicel. — On dry soil; rare. (Eu.)

7. **P. mùticum,** Schreb. Size of the last; leaves not carinate, costate, the perichætial ones 2; capsule erect; pedicel straight. — Moist ground. (Eu.)

8. **P. Schimperiànum,** Sulliv. (Musc. Bor.-Amer., No. 26.) Resembles the last two species, but the perichætial leaves near the apex are papillose on both surfaces, erose-dentate on the recurved margins, and cuspidate by the costa which extends scarcely ¼ of the way towards their base, the other leaves without any trace of a costa; capsule, pedicel, and calyptra as in No. 7. — San Marcos, Texas, *Wright.*

§ 4. PHASCUM PROPER. — *Stems simple, or once or twice divided by innovations: leaves costate; areolation below large, loose, oblong, above minute, subquadrate, chlorophyllose: calyptra cuculliform: capsule globular, acuminate.* — (Resembles the Pottieæ.)

9. **P. cuspidàtum,** Schreb. Leaves elongated-lanceolate, cuspidate, more or less papillose on the back near the apex; costa excurrent; capsule immersed or exserted; antheridia mostly naked in the axils of the perichætial leaves. — Old fields; not uncommon. (Tab. 15.) (Eu.)

§ 5. PLEURÍDIUM, Brid. — *Stems erect or decumbent: leaves subulate, costate, with a loose and oblong hexagonal reticulation: calyptra cuculliform or campanulate-conic: capsule globular or ovate, sometimes becoming lateral by innovations of the stem.*

10. **P. alternifòlium,** Brid. Lower leaves ovate-lanceolate, the upper much longer, subulate from an oblong base; costa excurrent, with the point more or less serrulate; capsule ovate, obtusely acuminate; calyptra cuculliform; male flower gemmiform, axillary. — Old fields, &c.; common. — In American forms the base of the leaves is usually more closely areolated than in the Eu-

ropean, and the point is more strongly serrulate: the capsule also is inclined to an oval shape. (Eu.)

11. **P. subulàtum,** Schreb. Very much like the last, but the base of the leaf not so suddenly dilated, more lanceolate, the point not so serrulate; calyptra smaller; the antheridia naked in the axils of the perichætial leaves. — Pennsylvania and Rhode Island: rare. (Eu.)

12. **P. palústre,** Br. & Sch. Distinguished from the last two species mainly by its campanulate-conic calyptra 4–5-lobed at the base: inflorescence as in No. 11. — Sandy soil, New Jersey, *James.* Louisiana. (Eu.)

13. **P. nervòsum,** Hook. Upper leaves more or less obovate-oblong, densely areolated above, serrate at the apex of the lamina, with a broad, long-excurrent costa; the lower leaves much smaller, oblong, acuminate, closely appressed; capsule ovate; pedicel short; calyptra cuculliform; male flower gemmiform at the base of the fertile stem. — Pennsylvania, *Drummond.*

§ 6. ÁSTOMUM, Hampe. — *Stems simple or branched, perennial: leaves elongated, costate, the terminal much larger, with a loose, hyaline areolation below; above minute, subquadrate, granulose: calyptra cuculliform: capsule globose or ovate, more or less rostellate.* — (Allied to the Weisieæ.)

* *Male flower gemmiform, axillary.*

14. **P. crìspum,** Hedw. Stems divided above, bearing several capsules on each branch; leaves crisped when dry, shortly cuspidate by the strong excurrent costa, the lower ovate-lanceolate, the upper linear-lanceolate from an oblong base, the margins above strongly convolute; capsule globose, apiculate, with a more or less obscure operculation. — It is uncertain if the species is truly American; but specimens (imperfect) from Texas and Indiana appear to belong to it. (Eu.)

15. **P. Sullivántii,** Schimp. Resembles the last, but has shorter stems, not so much branched; capsule solitary, shining, bright orange-colored; calyptra and spores smaller. — Very common.

16. **P. nitídulum,** Schimp. Near No. 15, but a smaller species, with a shining, pale chestnut-colored, oval, obliquely rostellate capsule, its pedicel thrice as long as in the last; calyptra minute, scarcely descending to the obscure line of operculation. — Central Ohio: rare.

* * *Male flower gemmiform, terminal on the main stem or its branches.*

17. **P. Ludovicìanum,** Sulliv. Larger than No. 14; leaves very much the same in every respect; capsule oblong-oval, obtusely rostellate, usually 2–3 in the same perichæth, borne on a branch arising from below the male flower. — (P. crispum, var. rostellatum, *Schwægr.? Hook. & Wils. in Drum. 2d Coll., No.* 10.) — New Orleans, *Drummond.*

## 5. BRÙCHIA, Schwægr. (Tab. 15.)

Calyptra mitriform, lobed at the base. Capsule obovate or oblong, rostellate, pedicellate: collum large. Columella present. Spores numerous, usually yellow, muriculate. Inflorescence monœcious: male flower gemmiform, termi-

nal on a short branch. — Minute terrestrial perennials, with mostly simple stems and lanceolate-subulate, continuously costate leaves of a loose oblong areolation at their base, elsewhere smaller, compact and roundish. (Named after *Bruch*, a distinguished bryologist.)

1. **B. flexuòsa,** Schwægr. Stems flexuose-erect, simple; leaves distant, spreading from an oblong base, long-subulate, channelled, denticulate at the apex; capsule obovate-oblong, exserted, abruptly passing into a rather long slender and flexuous pedicel, covered for half its length by the calyptra. — Var. NIGRICANS: Whole plant longer; leaves shorter, appressed; spores larger, dark brown. — New England to Florida, and westward; the var. on Raccoon Mountains, Alabama, *Lesquereux*, and Cleaveland, Ohio, *Prof. Cassels*.

2. **B. Beyrichiàna,** Hampe. Has (according to Schwægrichen) the leaves and pedicel of No. 1, but a much shorter stem, and the calyptra entirely covering the oblong capsule. — Maryland, near Baltimore, *Beyrich*. (Not since detected.)

3. **B. brévipes,** Hook. Stems short; leaves as in No. 1, but erect, overtopping the globose-oval somewhat pyriform capsule; pedicel short; spores nearly twice as large as in the first species. — Louisiana, *Drummond*.

4. **B. brevifòlia,** Sulliv. Size of No. 3; leaves much shorter, broader, erect, reaching only to the base of the large obovate-oblong and short-pedicelled capsule; spores as in No. 1. — (Bruchia Vogesiaca, var. 2, *Hook. & Wils. in Drum. 2d Coll. No. 15 partly.*) — Louisiana, *Drummond:* South Carolina, *Ravenel:* Texas, *Wright*. (Tab. I.)

5. **B. Ravenélii,** Wils. mss. Almost stemless; leaves lanceolate-subulate; costa excurrent and with a scabrous apex; capsule globose-pyriform, obtusely apiculate, slightly exserted, short-pedicelled; calyptra strongly papillose, 8-10-lobed at the base. — South Carolina, *Ravenel*. — (Very near the Chilian B. Hampeana, *C. Mull.*)

**B.** STEGOCÁRPI. — Capsule dehiscing by a deciduous operculum.

### TRIBE II. WEÍSIEÆ.

### 6. GYMNÓSTOMUM, Hedw. (Tab. 15.)

Calyptra cuculliform. Operculum conic-rostrate. Capsule suboval, annulate, exserted. Peristome none. Inflorescence dœcious: male flower terminal, gemmiform. — Rather small, densely cæspitose species, with linear-lanceolate costate leaves of a close, opaque, rather quadrate areolation. (Name from *γυμνός, naked*, and *στόμα, a mouth;* no peristome.)

1. **G. curviróstrum,** Hedw. Stems fastigiately branched; capsule obovate, shining; operculum with a long oblique rostrum. — Frequent, in dense cushions, on wet limestone rocks. (Eu.)

2. **G. rupéstre,** Schwægr. Smaller than the last; capsule oval, and with an erect elongated-conical operculum. — In similar situations with No. 1: variable. (Tab. I) (Eu.)

### 7. WEÍSIA, Hedw. (Tab. 15.)

Calyptra cuculliform. Operculum rostrate. Capsule oval, annulate, exserted. Peristome single, of 16 linear-lanceolate articulated teeth, entire or perforated, without a medial line. Inflorescence monœcious or dicœcious. — Small species, growing on the ground; stems more or less fastigiately branched; leaves linear-lanceolate, costate, of a dense and somewhat quadrate areolation. — (Named after *F. W. Weis*, a German cryptogamic botanist.)

1. **W. virídula,** Brid. Leaves very much involute on the margins, crisped when dry; costa slightly excurrent. — Old fields, meadows, &c.: very common and variable. (Tab. 15.) (Eu.)

### 8. RHABDOWEÍSIA, Br. & Sch. (Tab. 15.)

Calyptra cuculliform. Operculum with a long oblique rostrum. Capsule short-oval, 8-striated, annulate, exserted. Peristome single, of 16 subulate or lanceolate teeth, without a medial line. Inflorescence monœcious: male flower terminal, gemmiform. — Size and aspect of the species very much as in the last genus, from which it is separated by the striated capsule (hence its name, from *ῥάβδος*, *a stria*, and *Weisia*).

1. **R. fùgax,** Br. & Sch. Leaves linear-lanceolate, carinate, costate to the apex, nearly entire on the margins, crisped when dry, more or less papillose; the areolation dense and quadrate above, larger, looser, and oblong below; teeth of the peristome subulate, fugacious. — White Mountains, New Hampshire, *Oakes;* rare. (Tab. 15.) (Eu.)

2. **R. denticulàta,** Br. & Sch. Very near the last, but rather larger; leaves linear-lanceolate, approaching to lingulate, coarsely serrate at the apex; areolation larger; teeth of the peristome lanceolate, not fugacious. — Crevices of rocks, on high peaks of the Alleghany Mountains; not uncommon. (Eu.)

## Tribe III. SELIGERIÈÆ.

### 9. SELIGÈRIA, Br. & Sch. (Tab. 15.)

Calyptra cuculliform. Operculum large, obliquely rostrate. Capsule globose-pyriform, exannulate, exserted. Peristome single; teeth 16, lanceolate, obtuse, without a medial line. Inflorescence monœcious: male flower gemmiform, terminal. — Very small, almost stemless mosses, growing on rocks; leaves lanceolate-subulate, with a stout excurrent costa; the areolation dense, except at the base. (A personal name.)

1. **S. trísticha,** Br. & Sch. Stems 2″–3″ high, 3-ranked, obtuse at the apex. — (Weisia calcarea, *Musc. Alleghan., No.* 142.) — Limestone rocks, in shaded ravines, Central Ohio. (Tab. 15.) (Eu.)

2. **S. recurvàta,** Br. & Sch. Resembles the last (and grows with it), somewhat larger; leaves not 3-ranked, acute; capsule not so globose, pendulous on a longer curved pedicel, erect when dry. (Eu.)

## Tribe IV. DICRÀNEÆ.

### 10. ÁRCTOA, Br. & Sch. (Tab. 15.)

Calyptra cuculliform, inflated. Operculum large, obliquely rostrate. Capsule oval or somewhat turbinate, ribbed when dry, erect or inclined, annulate, exserted. Peristome single: teeth 16, lanceolate-subulate, cloven half-way, the divisions unequal. Inflorescence monœcious: male flower gemmiform. — Densely cæspitose alpine species, growing on rocks, with long lanceolate-setaceous falcate-secund costate leaves, of an oblong and compact areolation. (Name from *ἄρκτος, north;* found only in Northern latitudes.)

1. **A. fulvélla,** Br. & Sch. Leaves fulvous, with a strong continuous costa denticulate at the apex; perichætial leaves large, sheathing, overtopping the capsule. — White Mountains, New Hampshire, *Oakes.* (Tab. 15.) (Eu.)

### 11. CAMPÝLOPUS, Brid. (Tab. 15.)

Calyptra cuculliform, fringed at the base. Operculum conic-rostrate. Capsule oval, regular or gibbous, annulate, ribbed when dry, on a decurved pedicel. Peristome single: teeth 16, linear-lanceolate, deeply bifid; segments unequal. Inflorescence dicœcious: male flower terminal. — Stems densely cæspitose, dichotomously branched; leaves rigid, lanceolate-setaceous, with a broad excurrent costa; areolation large, oblong or rhomboid at the base, elsewhere much smaller and subquadrate. (Named from *καμπύλος, curved,* and *πούς, a foot,* in allusion to the curved pedicel.) (Tab. 15.)

1. **C. flexuòsus,** Brid. Stems 1′–2′ high, radiculose; leaves erect-patent or falcate-secund; capsules aggregated at the apex of the stem, regular or gibbous. — Shaded rocks, Grandfather Mountain, N. Carolina. (Tab. 15.) (Eu.)

2. **C. leucótrichus,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 73.) Stems densely leaved above, claviform; leaves erect-patent, linear-lanceolate, with a long hyaline and denticulate hair-point; costa very broad, strongly lamellose on the back. — On rocks, dry woods, Raccoon Mts., Alabama, *Lesquereux.*

3. **C. Leàmus,** Sulliv. Stems fastigiately branched; the branches terminated by dense heads of minute oblong bodies (probably abortive leaves); leaves lanceolate-subulate, erect, rather secund, the costa occupying nearly all the leaf. — Ohio and Pennsylvania: not rare; on very much decayed stumps and logs. Resembles the young growth of Dicranum flagellare.

### 12. DICRANODÓNTIUM, Br. & Sch. (Tab. 15.)

Calyptra cuculliform, not fringed at the base. Operculum conic-subulate. Capsule elliptic-oblong, annulate, smooth, pendulous from an arcuate pedicel. Peristome single: teeth 16, linear-lanceolate, cloven to the base; their divisions unequal. Inflorescence dicœcious: male flower gemmiform, terminal. — Habit and aspect nearly as in the last genus. (Name from *δίκρανος, fo·ked,* and *ὀδών, a tooth.*)

1. **D. longiróstre,** Br. & Sch. Stem 1′–3′ high, with innovations from near the apex; leaves fragile, more or less falcate-secund, subulate-setaceous from a dilated base; costa broad, occupying all the upper portion of the leaf. — On rocks, Alleghany Mountains. (Tab. 15.) (Eu.)

## 13. TREMÁTODON, Rich.

Calyptra cuculliform, inflated. Operculum subulate-rostrate. Capsule oval-oblong, inclined, with a very long collum, annulate, long-pedicellate. Peristome single: teeth 16, linear-lanceolate, perforated, or more or less cloven. Inflorescence dicœcious: male flower gemmiform. — Short-stemmed, gregarious plants, with long subulate-setaceous and continuously-costate leaves. (Name from *τρῆμα, a perforation,* and *ὀδών, a tooth.*) (Tab. 15.)

1. **T. longicóllis,** Rich. Capsule with a narrow linear collum of twice its length; pedicel 1½′–2′ long, slender, flexuous, straw-colored. — Clayey and sandy soil, New England to Florida, and Ohio, *Cassels.* (Tab. 15.)

## 14. DICRÀNUM, Hedw. (Tab. 16.)

Calyptra cuculliform. Operculum conic, long-subulate-rostrate. Capsule oval, oblong or cylindrical, regular or somewhat gibbous, erect or cernuous, long-pedicellate. Peristome single: teeth 16, linear-lanceolate, cloven half-way or more into two unequal segments. Inflorescence monœcious or dicœcious: male flower gemmiform, terminal. — Perennial plants, growing on the ground or on rocks; stems from a few lines to several inches in height, fastigiately branched and continued by innovations from near the apex; leaves mostly linear-lanceolate and lanceolate-subulate, continuously costate, often falcate-secund, with a minute, compact, roundish areolation above. (Name from *δίκρανος, forked,* alluding to the teeth.)

§ 1. CYNODÓNTIUM, Br. & Sch. — *Leaves more or less papillose, crenulate-serrate at the apex; the areolation uniform at the base: calyptra inflated-cuculliform: capsule mostly strumose and erect: monœcious.*

1. **D. gracilèscens,** Web. & Mohr., var. **tenellum,** Bryol. Europ. Stems short, 4″–10″ high; leaves linear-lanceolate, scarcely papillose, the margins above plane, the costa vanishing at the apex; capsule exannulate, oval, not strumose, obsoletely striate. White Mts., New Hampshire, *Oakes.* (Eu.)

2. **D. polycárpum,** Ehrh. Stems 1′–2′ high; leaves linear-lanceolate, variously curved, somewhat papillose on both surfaces, denticulate at the apex and at the base; capsule oval-oblong, erect, regular, or gibbous-inclined and strumose, ribbed when dry; annulus conspicuous. — Northern shore of Lake Superior, *Agassiz.* (Eu.)

3. **D. virens,** Hedw., var. **Wahlenbergii,** Bryol. Europ. More robust than the last; stems often 3′ high; leaves spreading, flexuous, lanceolate-subulate, smooth, denticulate at the apex, the costa nearly excurrent; capsule oblong, incurved, cernuous, prominently strumose, annulate. — Lake Superior *Agassiz.* (Eu.)

§ 2. DICRANÉLLA, Schimp. — *Small species: leaves smooth, more or less serrate at the apex; the areolation uniform at the base: calyptra not inflated: capsule mostly cernuous, seldom strumose: dicœcious.*

4. **D. cerviculàtum,** Hedw. Densely cæspitose, yellowish-green; stems short, 4″–6″ high; leaves lanceolate-subulate, serrate at the apex, somewhat secund, with a broad costa; capsule gibbous, short, globose-oval, narrowly annulate, strumose. — Bogs, New Jersey, *Torrey.* (Eu.)

5. **D. vàrium,** Hedw. Stems 4″–5″ high; leaves lanceolate-attenuated, nearly entire at the apex, patent; costa slightly excurrent; capsule oval or oblong, more or less oblique and incurved, exannulate; operculum large, shortly rostrate. — Clay-banks, in loose patches: very common: variable. (Eu.)

6. **D. débile,** Hooker & Wilson. Resembles small forms of No. 5; stems 2″–3″ high, mostly simple, leaves erect; the lower short, ovate-lanceolate, rather obtuse; the upper linear-lanceolate, channelled, and with entire reflexed margins, costate to the apex; capsule oval, erect; operculum with a small conic base, and an erect subulate rostrum as long as the capsule; peristome small: teeth 2–3-cleft half-way, below red, strigillose, the segments scabrous; annulus very large, deciduous, triple; spores rather large; pedicel yellow. — Clayey soil, Mobile, Alabama?

7. **D. ruféscens,** Turner. Stem short, gregarious; leaves reddish, lax, linear-lanceolate, falcate-secund, the margins plane, obscurely denticulate; areolation loose; capsule erect, oval or somewhat obovate, exannulate; operculum large, with a short rostrum. — Wet clay-banks, Pennsylvania, *Lesquereux.* — Resembles No. 5. (Eu.)

8. **D. subulàtum,** Hedw. Loosely cæspitose; stems 5″–10″ high; leaves secund, somewhat falcate, long-subulate from a lanceolate base, entire; costa predominant; capsule ovate, gibbous, cernuous, striated when dry; annulus rather large; pedicel red. — White Mts., New Hampshire, *Oakes.* (Eu.)

9. **D. heterómallum,** Hedw. Somewhat larger than the last; leaves secund, slightly falcate, lanceolate-setaceous; costa heavy, vanishing at the subdenticulate apex; capsule cernuous or nearly erect, more or less obovate and gibbous, obliquely plicate when dry; pedicel pale yellow. — Var. ORTHOCÁRPUM has an erect cylindrical capsule. — Moist ground; very common. (Eu.)

§ 3. DICRANUM PROPER. — *Mostly large species: stems often densely tomentose for their whole length with radicular fibres: leaves with enlarged yellowish and diaphanous cellules at their basal angles: capsule cernuous or erect.*

* *Monœcious: leaves falcate: capsule cernuous.*

10. **D. Blýttii,** Bryol. Europ. Cæspitose; branches fragile; leaves soft, dull-green, flexuose, rather secund, crisped when dry, the costa slightly excurrent; capsule oval, when dry strumose; annulus simple. — Alpine and subalpine rocks, White Mountains of New Hampshire, *Oakes.* (Eu.)

11. **D. Stárkii,** Web. & Mohr. Stems 1′–3′ long, decumbent at the base; leaves long, subulate-setaceous from a lanceolate base, secund, not crisped when dry, the costa shortly excurrent; capsule oblong, gibbous, strumose, striated; annulus double. — With the last. (Eu.)

* * *Dœcious: stems tomentose: capsule erect, regular.*

12. **D. montànum,** Hedw. Compactly cæspitose; leaves bright-green soft, patent, rather secund, crisped when dry, lanceolate-subulate, serrate on the margin, and papillose on the back at the apex; costa strong, percurrent; capsule oblong, sulcate when dry; annulus double. — On trunks of trees, Goat Island, Niagara Falls, *Lesquereux.* (Eu.)

13. **D. flagellàre,** Hedw. Near the last species, but distinct by its numerous fragile and short erect flagellæ, furnished with minute appressed lanceolate ecostate leaves; stem-leaves greenish-yellow, more falcate-secund; the capsule longer and narrower. — On decayed logs in woods; very common. (Eu.)

14. **D. interrùptum,** Br. & Sch. Stems 1′–2′ high; leaves long, secund-falcate, or spreading every way, flexuous, subulately attenuated from a lanceolate base; costa broad, predominant, denticulate at the apex; capsule cylindrical, annulate, dark brown. — On rocks in mountain districts. — A rather harsh, dark-green species, somewhat larger than No. 12 and 13. (Eu.)

15. **D. longifòlium,** Hedw. Loosely cæspitose, pale-green; stems elongated, slender, arcuate-ascending; leaves circinate-secund, very long, filiformly attenuated, with a remarkably broad costa, denticulate on the margins and the back at the apex; capsule elliptic-cylindrical. — Shaded rocks, Alleghany Mountains. (Eu.)

* * * *Dœcious: stems tomentose: capsule incurved-cernuous.*

16. **D. scopàrium,** L. Loosely cæspitose; stems 2′–4′ high; leaves secund or falcate-secund, lanceolate-subulate, carinate-concave, serrate at the apex; costa with prominent ridges at the back, dentate above; capsule cylindrical, slightly cernuous. — Var. PALLIDUM (Musc. Alleghan., No. 155) has narrower leaves, with a looser areolation, the lower areolæ not sinuous, the costa with ridges only near the point; pedicel pale yellow. — Alleghany Mountains; rare. — The variety in districts not mountainous, and very common. (Tab. 16.) (Eu.)

17. **D. elongàtum,** Schwægr. Compactly cæspitose; stems slender, 4′–5′ long; leaves lanceolate-subulate, entire, erect-patent; capsule gibbous-ovate, striate, annulate. — High peaks of the Alleghany Mountains: north shore of Lake Superior, *Agassiz.* (Eu.)

18. **D. congéstum,** Brid. Loosely cæspitose; leaves spreading, subsecund, flexuous, lanceolate-subulate, denticulate at the apex, crisped when dry; costa strong, excurrent; capsule oval-oblong, much incurved, striated. — On rocks, in mountainous districts; common. (Eu.)

19. **D. palùstre,** Brid. Stems 3′–4′ high; leaves spreading, linear-lanceolate, undulated, serrate on the margin and also the back at the apex; costa slender and vanishing below the point; capsule oval-oblong, slightly incurved, striated; annulus none. — In cranberry marshes, Northern Ohio, *Lesquereux.* (Eu.)

20. **D. Schràderi,** Web. & Mohr. Densely tufted; stems 3′–5′ long; leaves crowded, erect-patent, oblong-lanceolate, rather obtuse, undulated, the upper half serrated on the margins and papillose on the back; costa ceasing

below the apex; capsule incurved-oblong, annulate. — Bogs, in mountainous districts. (Eu.)

21. **D. spùrium,** Hedw. Stems usually short, thick and condensed; leaves ovate-lanceolate, acuminate, undulated, serrate; costa serrated on the back above, ceasing below the apex; capsule cylindrical, slightly strumose and incurved; when dry strongly ribbed. — (D. pallidum, *Bryol. Europ.?*) — Dry sandy soil, Ohio, and Southern States. (Eu.)

22. **D. undulàtum,** Turner. Loosely cæspitose; stems 4 – 6′ long, robust; leaves widely spreading, the upper ones falcate-secund, linear-lanceolate from an oblong base, very much undulated, sharply serrate on the margin and the back near the apex; costa slender; capsule cylindrical, strongly arcuate, on long pedicels, 2 to 5 from the same perichæth. — On the ground, in dry woods; common. (Eu.)

23. **D. Drummóndii,** Mull. — Very like No. 22, but distinguished by its longer and narrower leaves, not so sharply serrate, papillose only on the back, and cirrhose-crisped when dry. — White Mountains of New Hampshire, *Oakes:* Lake Superior, *Agassiz.* (Eu.)

## 15. CERÁTODON, Brid. (Tab. 15.)

Calyptra cuculliform. Operculum conic, subrostellate. Capsule cylindrical, subcernuous, annulate, long-pedicellate. Peristome single: teeth 16, linear-lanceolate, cloven nearly to the base into two equal segments; their articulations prominent. Inflorescence dicœcious, terminal: male flower gemmiform. — Densely cæspitose plants, with fastigiate ramification; leaves lanceolate or lanceolate-subulate, costate; the areolæ above dense, roundish and small, below larger and diaphanous. (Name from κέρας, *a horn*, and ὀδών, *a tooth*, the teeth of the peristome being nodulose like a goat's horn.)

1. **C. purpùreus,** Brid. Leaves oblong-lanceolate, carinate, the margins recurved; costa excurrent; capsule purplish-red, shining, ribbed and strumose when dry. — Very common everywhere: on the ground. (Tab. 15.) (Eu.)

### Tribe V. LEUCOBRYÈÆ.

## 16. LEUCÒBRYUM, Hampe. (Tab. 16.)

Calyptra cuculliform. Operculum with a long-subulate rostrum. Capsule oblong-cernuous, strumose, long-pedicellate. Peristome as in Dicranum. Inflorescence monœcious: male flower terminal. — White or pale-glaucous mosses, growing in dense compact masses; stems dichotomously branched; leaves lanceolate-subulate, ecostate, composed of two or more layers of large, pellucid, empty, rectangular-oblong, perforated cellules, with minute 3 – 4-sided intercellular chlorophyllose passages. (Name composed of λευκός, *white*, and βρύον, *a moss*, from its pallid color.)

1. **L. glaùcum,** Hampe. Stems 3′ – 6′ high, leaves fragile, crowded, convolute above; capsule reddish-brown, ribbed when dry. — (Dicranum glaucum, *Hedw.*) — About the roots of trees in moist ground, margins of swamps,

&c.; common: ripens its fruit (which is scarce) in October and November. (Tab. 16.) (Eu.)

2. **L. mìnus,** Hampe. Besides numerous discrepancies, singly of not much importance, this species differs from the last in its much smaller size, its preference for dry localities, and the time (May and June) of ripening its fruit. — On the ground, dry woods; not rare. (Eu.)

## Tribe VI. FISSIDÉNTEÆ.

### 17. FÍSSIDENS, Hedw. (Tab. 15.)

Calyptra cuculliform, or conic-mitriform. Capsule oval or oblong, erect or cernuous, rather long-pedicellate. Operculum conic-rostrate. Peristome single: teeth 16, geniculate-inflexed: — otherwise as in Dicranum. Inflorescence various. — Frond-like plants; the leaves exactly two-ranked, inserted on opposite sides of the stem, their proper lamina infolded-boat-shaped, producing from the keel an equitant blade, which forms the principal portion of the leaf; areolation minute, hexagonal-rotund. (Name from the Latin *fissus*, split, and *dens*, a tooth.)

* *Fruit terminal.*

1. **F. hyalìnus,** Hook. & Wils. Stems 1″–2″ high, erect, simple; leaves oblong-lanceolate, acute, without any costa; areolation large and hyaline; capsule erect, oval; calyptra conic, entire at the base. — Damp earth, in shady woods, near Cincinnati, Ohio: found only by the late *T. G. Lea.*

2. **F. obtusifòlius,** Wils. Stems simple, 2″–3″ high; leaves oblong-oval, very obtuse, costate nearly to the apex; capsule obovate-oval; operculum convex-conic, with a very short rostrum; spores large; calyptra cuculliform: dioecious; male flower terminal. — Wet and shaded rocks, near rivulets; Central and Southern Ohio.

3. **F. exìguus,** Sulliv. Size, inflorescence, and calyptra as in the last; leaves oblong-lanceolate, costa ceasing near the apex; capsule oval, somewhat oblique; operculum rather short-rostrate. — Damp rocks in shaded ravines, &c.; common.

4. **F. minùtulus,** Sulliv. Size, inflorescence, and calyptra as in the two preceding species; leaves linear-lanceolate, with a transparent wavy border; costa vanishing near the summit; capsule oval, erect; operculum rather long-rostrate. — With the last.

5. **F. bryoìdes,** Hedw. Somewhat larger than the last three; capsule and operculum same as in No. 4; leaves oblong-lanceolate, with a thickened border; costa excurrent; calyptra cuculliform: monoecious; male flowers numerous, axillary. — Moist and shaded banks. (Eu.)

6. **F. Ravenélii,** Sulliv. Size, calyptra, and inflorescence as in No. 2; leaves linear-lanceolate, costate to the apex, subpapillose, repand-dentate on the pellucid margins of the true lamina, denticulate on the blade; areolation minute, opaque; capsule elliptic-oblong, papillose. (*Mem. Amer. Acad.*, n. ser., 4, p. 171, t. 2.) — Damp ground, S. Carolina, *Ravenel, Curtis.*

7. **F. osmundioìdes,** Hedw. Stems erect, 1′–1½′ high, branched;

leaves oblong, obtuse, apiculate, the costa vanishing near the apex; capsule oval-oblong, erect or oblique; operculum long-rostrate; calyptra subulate from a mitriform lobed base; inflorescence as in No. 2. — On the roots of trees, in swamps. (Eu.)

* * *Fruit axillary.*

8. **F. subbasilàris,** Hedw. Stems 5″–10″ high, densely cæspitose, radiculose, branched; leaves elongated-oblong, obtuse, apiculate, eroded-denticulate at the summit, near which the costa vanishes; capsule erect, oval-oblong on a pedicel arising from near the base of the stem; operculum long-rostrate; calyptra cuculliform. — On decayed logs and trees, near the ground.

9. **F. taxifòlius,** Hedw. Stems 5″–8″ high, branched and fasciculate from the base; leaves elongated-oblong, minutely denticulate on the subpellucid margin, obtuse; costa shortly excurrent; capsule oblong or obovate, inclined or horizontal; operculum, calyptra, and origin of the pedicel as in the last: monœcious; male flower gemmiform at the base of the fertile stem. — Woods, in sandy soil. (Tab. 15.) (Eu.)

10. **F. adiantoìdes,** Hedw. Stems much branched, 1′–3′ long; leaves oblong-lanceolate, serrulate, 2 or 3 rows of the marginal cellules transparent; costa percurrent; capsule oval-oblong, inclined; pedicel from the middle of the stem; operculum and calyptra as in No. 8; inflorescence as in No. 5. — Shaded moist places, on the ground, and on wet rocks. (Eu.)

11. **F. polypodioìdes,** Hedw. Stems broad, 1′–2′ high; leaves ovate- or elongated-oblong; costa vanishing at the subdenticulate obtuse apex; capsule obovate-oblong; operculum subulate-rostrate from a large rather hemispherical base; pedicel short, flexuous, arising from the upper part of the stem; calyptra cuculliform: dœcious. — Wet rocks, Georgia, *Lesquereux.*

12. **F. grándifrons,** Brid. Stems erect, 2′–3′ high, sparingly branched; leaves linear-lanceolate, thick, composed of several strata of cellules, the costa ceasing below the apex; fertile flower gemmiform, axillary, containing 30–60 archegonia; male flower and fruit unknown. — Niagara Falls (American side), on the perpendicular faces of rocks, moistened by the spray. (Eu.)

## 18. CONOMÍTRIUM, Montagne. (Tab. 15.)

Calyptra small, campanulate-mitriform, lobed at the base. Operculum hemispherical, apiculate. Capsule immersed spherical, nearly sessile, exannulate. Peristome none. Inflorescence monœcious or hermaphrodite: paraphyses globosely distended at the apex.—A genus, by its feeble dehiscence, globose capsule, and the characters of vegetation, forming an intermediate link between Physcomitrella among Cleistocarpous, and Physcomitrium among Stegocarpous Mosses. (Name from *ἀφανής, unapparent,* and *ῥῆγμα, rupture,* or *suture;* i. e. dehiscence obscure.)

1. **C. Julianum,** Mont. Stems 2′–5′ long, filiform, floating, much divided; leaves distant, linear-lanceolate, acute, costate to the apex; capsule obconic, tapering into a short pedicel, the two together scarcely longer than the operculum, whose rostrum only is covered by the calyptra. — Ohio and southward, attached to stones in shallow brooks, &c. (Tab. 15.) (Eu.)

## Tribe VII. TRICHOSTÒMEÆ.

### 19. TRICHÓSTOMUM, Br. & Sch. (Tab. 15.)

Calyptra cuculliform. Operculum conic-rostrate. Capsule oval or cylindrical, mostly erect, long-pedicellate. Peristome single: teeth 32, linear, approximate in pairs. Inflorescence various. — Plants growing on the ground or on stones, of a rather rigid habit; stems simple or dichotomously divided; leaves varying from lanceolate to lanceolate-subulate, costate to or beyond the apex; areolation loose below, dense and roundish above. (Name from *θρίξ, a hair,* and *στόμα, a mouth,* in allusion to the capillary teeth of the peristome.)

1 **T. tórtile,** Schrad. Stems mostly simple, 3″–5″ high; leaves lanceolate-subulate, spreading, often subsecund, reflexed on the margin; costa excurrent; capsule cylindrical; operculum shortly rostrate; annulus simple: dicœcious; male flower terminal. — Road-sides, clay-banks: frequent. (Tab. 15.) (Eu.)

2. **T. ténue,** Hedw. Distinguished from small forms of the last, which it much resembles, mainly by its large double annulus, firmer and brownish-red capsule, and the plane (not reflexed) margin of the leaf. — Pennsylvania, according to *Hedwig.* (Eu.)

3. **T. váginans,** Sulliv. Stems 6″–10″ high, slender; stem-leaves erect, appressed, ovate-lanceolate; the perichætial leaves sheathing, suddenly attenuated, spreading at the apex, the costa strong and excurrent; capsule oval-oblong; teeth of the peristome short, anastomosing in pairs; annulus double, very large, its width equal to half the length of the teeth; pedicel slender, flexuous; operculum elongated-conic, obtuse; inflorescence as in No. 1. — Sides of ditches and roads, Pennsylvania and New England.

4. **T. pállidum,** Hedw. Stems short, 3″–4″ high; leaves long-setaceous from a lanceolate base; costa broad, excurrent, denticulate at the apex; capsule oblong-elliptic. — Clayey grounds; frequent. — Conspicuous by its numerous, long (1½′–2′ high) straw-colored pedicels; monœcious; male flower gemmiform, in the axils of the upper leaves. (Eu.)

5. **T. glaucéscens,** Hedw. Stems densely cæspitose, 6″–10″ high, fastigiately branched; lower leaves small, remote, lanceolate; the upper larger, and crowded into a terminal tuft, linear-lanceolate, costate to the apex, the plane margins denticulate above; capsule oval-oblong; operculum elongated-conic. Shores of Lake Superior, *Agassiz.* — Remarkable for the glaucous hue of its foliage. (Eu.)

### 20. BÁRBULA, Hedw. (Tab. 15.)

Calyptra cuculliform. Operculum subulate-conic. Capsule oval-oblong or cylindrical, long-pedicellate. Peristome single: teeth 32, very long, filiform, contorted, connected at the base by a short or long tubular membrane. Inflorescence various. — In habit, ramification, texture, and mostly in the form of the leaves, allied closely to Trichostomum: differing chiefly in the torsion of the peristome. (Name a diminutive of *barba,* beard, in allusion to the capillary peristome.)

** Teeth of the peristome arising from a short basilar membrane.*

1. **B. unguiculàta,** Hedw. Stems ½′–1′ high, branched; leaves erect-patent, oblong-lanceolate, rather obtuse, shortly cuspidate by the excurrent costa, revolute on the margins; capsule cylindrical, erect; annulus none: dœcious; male flower terminal. — Clayey soil, &c.; frequent. (Tab. 15.) (Eu.)

2. **B. cæspitòsa,** Schwægr. Stems short, condensed; leaves crowded, linear-oblong, shortly acuminate, cuspidate by the slightly excurrent costa, undulate on the margins; capsule cylindrical, erect or subarcuate; annulus none: monœcious; male flower axillary. — Woods, about the roots of trees. — Readily known by its pale-green foliage, and yellow capsule with a red operculum. (Eu.)

3. **B. convolùta,** Hedw. Stems short, crowded; leaves spreading, oblong-lanceolate, rather obtuse, the margins plane; costa ceasing at or below the apex; perichætial leaves oblong, almost truncate, convolute, the upper ones ecostate; capsule cylindrical, oblique; annulus distinct; pedicel (1′ high) yellow; inflorescence dœcious. — Raccoon Mts., Alabama, *Lesquereux.* (Eu.)

4. **B. tortuòsa,** Web. & Mohr. Stems 1′–3′ high, dichotomously branched; leaves very long, linear-lanceolate, spreading, flexuose, undulated on the margins, crisped when dry, costa slightly excurrent; capsule cylindrical, inclined: dœcious. — On rocks, Alleghany Mountains. — One of the largest species of the genus. (Eu.)

5. **B. squarròsa,** Notaris. Stems loosely cæspitose, 1′–2′ long, branched; leaves long, from a broad sheathing base, squarrose-recurved, narrowly lanceolate, denticulate above, undulate, crisped when dry, longer and crowded at the apex of the stem, the margins below diaphanous; costa slightly excurrent. (Capsule cylindrical, slightly inclined; annulus simple: dœcious. *Bryol. Eur.*) — On trees, in a cedar swamp, a quarter of a mile south of Lebanon, Wilson County, Tennessee, *Robinson,* 1842. Without fruit. (Eu.)

*** Teeth of the peristome arising from a long tubular and tessellated membrane.*

6. **B. mucronifòlia,** Br. & Sch. Stems short and thick; leaves condensed, oblong or obovate-oblong, mucronate by the excurrent costa; capsule cylindrical, regular or slightly curved; annulus double; operculum rather short: inflorescence as in No. 2. — Rocky banks of streams, &c.; frequent. (Eu.)

7. **B. ruràlis,** Hedw. Stems 1′–3′ high, branched, loose; leaves squarrose-recurved, oblong or obovate, very obtuse, concave-carinate, reflexed on the margins; costa excurrent into a long, spinulose-dentate, white, capillary point; capsule subcylindrical, erect or slightly arcuate, annulate: dœcious. — On rocks, Nahant, Massachusetts, *D. Murray:* Texas, *Wright.* (Eu.)

**** Inflorescence and fruit unknown.*

8. **B. papillòsa,** Wils. Stems short (3″–4″ high), thick, crowded; leaves close, recurved-spreading, oblong-spatulate, very concave above, shortly hair-pointed, papillose on the back; areolæ rather large, quadrate, granulose, those at the base larger, oblong, pellucid; costa percurrent, bearing crowded slightly pedicellate gemmæ on its papillose upper surface, each composed of 2 to 5 clustered roundish green cellules. — (Pottia Russellii, *Sulliv. mss.,* 1848.) — Trunks of Elm trees, Mass., *J. L. Russell,* 1843; common. — Until lately considered a gemmiparous state of the last species. (Eu.)

### 21. DESMÁTODON, Brid. (Tab. 16.)

Calyptra cuculliform. Operculum conic, obtusely rostrate. Capsule oval-oblong or cylindrical, annulate, long-pedicellate. Peristome single: teeth 16, subulate, 2–3-cleft, united by a basilar membrane. Inflorescence monœcious or diœcious. — Plants of rather low stature, growing on the ground or on rocks, in general habit, ramification, and structure of leaves having much in common with Trichostomum and Barbula. — (Name from δέσμα, -ατος, *a band*, and ὀδών, *a tooth*, in allusion to the membrane uniting the teeth.)

1. **D. arenàceus,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 93.) Stems 2″–3″ high, gregarious; leaves oblong, linguæform, very obtuse, slightly denticulate at the apex; apiculate by the excurrent costa; capsule cylindrical, tapering into the pedicel (4″–5″ long); annulus simple, persistent; teeth of the peristome 2-cleft, straight, white. — Sandstone rocks, Ohio. — Near D. flavicans.

2. **D. plinthòbius,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 94.) Stems 2″–5″ high, fastigiately branched; leaves erect, elongated-oblong, very obtuse, carinate-concave, narrowly reflexed on the margins; areolation minute, opaque, dot-like above, larger oblong and pellucid below; costa excurrent into a smooth white hair-point nearly as long as the leaf; capsule elliptic-cylindrical, its mouth orange-red; operculum ½ the length of the capsule; teeth of the peristome pale yellow, more or less cloven along the medial line; annulus large: diœcious. (Barbula muralis, *James;* not of *Hedw.*) — Grows in hoary or pale-green and dense patches, on brick pavements, Charleston, S. Carolina, *Ravenel:* on the walls of the College at Nashville, Tennessee, *Lesquereux.* (Tab. 16.)

### 22. DIDÝMODON, Br. & Sch. (Tab. 16.)

Calyptra cuculliform. Operculum conic, shortly and obtusely rostrate. Capsule subcylindrical, annulate, long-pedicellate. Peristome single: teeth 16, linear-lanceolate, entire, or more or less bifid, rather short, fugacious, and without a basilar membrane. Inflorescence various. — Very nearly allied to the last genus; and it is questionable if either is entitled to rank higher than as a section of Trichostomum. (Name from δίδυμος, *twin*, and ὀδών, *a tooth.*) (Tab. 16.)

1. **D. rubéllus,** Br. & Sch. Stems ½′–1′ high, loosely cæspitose; leaves spreading, oblong-lanceolate, recurved on the margins, costate to the apex, the upper ones dull-green, the lower reddish; annulus simple; antheridia naked in the axils of the perichætial leaves. — Pennsylvania, on the ground; rare (Tab. 16.) (Eu.)

2. **D. lùridus,** Hornsch. Rather smaller than the last; leaves lurid-green, rigid, ovate-lanceolate, with a reddish-brown costa, ceasing at the apex; peristome minute, irregular; male flower terminal on a separate plant. — Falls of Niagara, *Drummond.* (Eu.)

## Tribe VIII. DISTICHIÈÆ.

### 23. DISTÍCHIUM, Br. & Sch. (Tab. 16.)

Calyptra cuculliform, long-rostrate. Operculum conic, short. Capsule oval-

oblong or cylindrical, annulate, long-pedicellate. Peristome single: teeth 16, linear-lanceolate, more or less cloven and perforated. Inflorescence monœcious. — Alpine species, growing upon moist rocks; stems densely cæspitose, dichotomously branched, with distichous and subulate-setaceous costate leaves, of an areolation dense roundish above, enlarged diaphanous below. (Name from δίστιχος, *two-ranked*, referring to the leaves.)

1. **D. capillàceum,** Br. & Sch. Stems 1′–2′ high; leaves abruptly long-subulate from a dilated sheathing base, spreading, flexuose, the costa percurrent; capsule subcylindrical, erect; antheridia axillary, naked. — Northern shore of Lake Superior, *Agassiz.* (Tab. 16.) (Eu.)

2. **D. inclinàtum,** Br. & Sch. Not so tall as the last; leaves more crowded and narrower, the perichætial ones 3-ranked; capsule cernuous, oval; antheridia with perigonial leaves. — Northern shore of Lake Superior, *Agassiz.* (Eu.)

## 24. EUSTÍCHIUM, Bryol. Europ. (Tab. 16.)

1. **E. Norvégicum,** Bryol. Europ. Stems frond-like, flat, mostly simple (about 1′ long and 1″ broad), rooting only at the bulb-like base; leaves 2-ranked, complicate, closely imbricating, erect; those on the middle of the stem elongated-oblong, obliquely truncate, shortly acuminate, increasing in size as they ascend; the perichætial leaves attenuated into a long and linear, flexuous, pellucid, flat, equitant, and slightly serrulate point longer than the lamina; areolation above subrotund, below oblong, that of the point of the perichætial leaves linear; costa percurrent, its upper part narrowly winged: dicœcious; flowers of both kinds terminal: fruit unknown. — Pendent on the perpendicular faces of sandstone rocks, six miles south of Lancaster, Fairfield County, Ohio. — The only other certain habitat recorded for this very interesting Moss is Iceland. That of Norway is apparently a mistake. — It is probably closely allied to Fissidens. (Sulliv. in Mem. Amer. Acad. n. ser. 3. p. 57. t. 1.) (Tab. 16.)

## Tribe IX. POTTIÈÆ.

## 25. PÓTTIA, Ehrh. (Tab. 16.)

Calyptra cuculliform. Operculum depressed-conic, more or less rostrate. Capsule obovate-truncate or oval-oblong, exserted or immersed. Peristome none. Inflorescence monœcious: male flower axillary. — Small annual or biennial plants, growing on newly exposed soil, with entire ovate-oblong or obovate-lanceolate and rather broadly costate leaves, of a quadrate or rectangular areolation, enlarged at the base. (Named in memory of *Professor J. F. Pott,* a German botanist.)

1. **P. truncàta,** Br. & Sch. Stems 2″–4″ high, gregarious, simple or branched; leaves obovate-lanceolate, mucronate by the excurrent costa; capsule obovate, truncate; operculum obliquely rostrate. — (P. eustoma, *Ehrh.* Gymnostomum truncatulum, *Hedw.*) — On the ground, New England and Pennsylvania. (Tab. 16.) (Eu.)

## Tribe X. TETRAPHÍDEÆ.

### 26. TÉTRAPHIS, Hedw. (Tab. 16)

Calyptra mitriform, large, irregularly plicate, lacerate at the base. Operculum acutely conic. Capsule subcylindrical, long-pedicellate. Peristome single: teeth 4, three-sided, elongated-pyramidal, longitudinally striated on the back, not articulated. Inflorescence monœcious: male flower gemmiform, terminal. — Perennial, growing on much decayed wood; stems slender, simple or branched, often bearing at their apex leafy cup-shaped receptacles filled with lentiform pedicelled gemmæ; leaves ovate-lanceolate, 3-ranked, costate, with an hexagonal-rotund areolation. (Name from *τέτρα, four*, and *φύς, produced.*)

1. **T. pellúcida,** Hedw. Stems ½′–1′ high, closely tufted, reddish below, light green above. — Woods; common. (Tab. 16.) (Eu.)

### 27. TETRODÓNTIUM, Schwægr.

Calyptra large, mitriform, plicate, laciniate at the base, sometimes split on one side to the apex. Operculum conic. Capsule oval, exsertly pedicellate. Peristome as in Tetraphis, but the teeth shorter. Inflorescence monœcious: male flower gemmiform, terminal. — Minute bulb-like annuals, growing upon rocks (differing from Tetraphis chiefly in habit and structure of the foliage), with closely imbricated ovate-lanceolate scarcely costate leaves, rooting at the base and throwing out leafy flagelliform branchlets, or long linear-clavate frondose processes, sometimes trifid at the apex. — (Name from *τέτρα, four*, and *ὀδών, tooth.*)

1. **T. repándum,** Funk. Frondose processes very rare; pedicel 3″–5″ high; mouth of the capsule repand or notched between the teeth. — Damp shaded situations, on the ground near the "Glen House," Gorham, White Mountains of New Hampshire, *James.* (Eu.)

## Tribe XI. ENCALÝPTEÆ.

### 28. ENCALÝPTA, Schreber. (Tab. 16.)

Calyptra large, cylindrical-campanulate, longer than the capsule, subulate-rostrate, uneven or fringed at the base. Operculum conic, with a long slender subclavellate rostrum. Capsule elongated-ovate-cylindrical, long-pedicellate. Peristome variable, either absent, single or double. Inflorescence monœcious or diœcious. — A well-marked genus, approaching in habit and mode of growth the larger species of Barbula. — (Name from *ἐγκαλυπτός, covered with a veil*, in allusion to the remarkably large calyptra.)

1. **E. ciliàta,** Hedw. Stems ½′–1′ high, thick, radiculose, simple or sparingly branched; leaves rather large, crowded, recurved-spreading, oblong-ovate or ligulate, shortly acuminate, slightly concave, rather undulate on the margin, somewhat crenulate near the apex; areolation dot-like, granulose above, enlarged oblong and diaphanous below; costa excurrent into a short point; peristome single, with 16 lanceolate distantly articulated teeth, without a medial

line, capsule smooth; annulus none; calyptra fringed at the base: monœcious; male flower gemmiform, axillary. — Rocks, Lake Superior, *Agassiz:* Jefferson County, New York. (Eu.)

2. **E. rhabdocárpa,** Schwægr. Differs from the last by its longer-pointed or piliferous leaves, and longitudinally ribbed capsule; annulus present; calyptra not fringed at the base; peristome and inflorescence the same. — British America, *Drummond.* (Tab. 16) (Eu.)

3. **E. commutàta,** Nees & Hornsch. Stems more slender than in No. 1; leaves subsquarrose, ovate-lanceolate, gradually long-acuminate, concave, undulate on the margin; areolæ very small; costa excurrent; capsule smooth; peristome none; annulus simple; base of the calyptra uneven, not fringed: monœcious. — British America, *Drummond.* (Eu.)

4. **E. streptocárpa,** Hedw. Stems more elongated than in No. 1; leaves not so spreading, ligulate, costate to the obtuse or cucullate apex; capsule spirally ribbed; peristome double; teeth 16, filiform, nodose; annulus compound; calyptra spinulose at the apex, crenate at the base; inflorescence dicœcious. — British America, *Drummond.* — The Alleghany specimens usually referred to this species are without fruit, and hence doubtful. (Eu.)

### 29. SYRRHÓPODON, Schwægr. (Tab. 16.)

Calyptra large, campanulate-conic, rostrate, cloven on one side. Operculum conic, with a long-subulate rostrum. Capsule elliptic-cylindrical, exannulate, exsertly pedicellate. Peristome single: teeth 16, linear-lanceolate, articulated, without a medial line, short, nearly horizontal, inserted below the mouth of the capsule. Inflorescence dicœcious or monœcious. — Perennial plants (the tropical representatives of Encalypteæ), with densely cæspitose simple or dichotomously branched stems, and costate elongated-ligulate leaves, from a whitish sheathing base composed of large pellucid rectangular areolæ, which elsewhere are minute, opaque, and granulose. (Name from *σύρροπος, connivent,* and *ὀδών, a tooth,* alluding to the horizontal position of the teeth of the peristome.)

1. **S. Floridànus,** Sulliv. Stems about 1′ high; leaves erect-patent from an amplexicaul base; the margins convolute, thickened, more or less narrowly bilamellate, undulated, serrated; costa ceasing at or below the obtuse apex. (Syr. albovaginatus, *Hook. & Wils. in Drum. 2d coll., No.* 37.) — Northern shore of the Gulf of Mexico; also Florida: frequent. (Tab. 16.)

## Tribe XII. ZYGODÓNTEÆ.

### 30. ZÝGODON, Hook & Tayl. (Tab. 16.)

Calyptra small, cuculliform, smooth, oblique. Operculum obliquely rostrate from a conic base. Capsule pyriform, apophysate, striated, on a rather short pedicel, immersed or exserted. Peristome either double, single, or absent; when present, constructed as in (the nearly related genus) Orthotrichum. — Perennial species, growing on trees or on rocks, in large patches; stems with fastigiate branches, fertile at the apex; leaves linear-lanceolate, carinate, continuously

costate, plane on the margins; areolæ above guttulate; below, enlarged oblong. (Name from *ζυγός, a pair,* and *ὀδών, teeth,* in allusion to the paired teeth.)

1. **Z. Lappónicus,** Br. & Sch. Stems $\frac{1}{2}'-1'$ high, radiculose; leaves spreading, crisped when dry; capsule scarcely exserted, 8-ribbed; peristome none: monœcious; male flower gemmiform. — Rocks, on the White Mountains of New Hampshire, *Oakes:* Alleghany Mountains of Pennsylvania, *Lesquereux.* (Tab. 16.) (Eu.)

2. **Z. Mougeótii,** Br. & Sch. More elongated and branched than No. 1; differing chiefly in its narrower and less concave perichætial leaves twice as long, the longer rostrum to the operculum, and the dicœcious inflorescence. — With No. 1, in similar places, according to *Mr. Th. P. James.* (Eu.)

3. **Z. Sullivántii,** Mull. Stems $1'-2'$ high, slender, with long filiform branches; leaves subsquarrose from an erect half-clasping base, complicate-concave; the margins below recurved, above plane and strongly serrate; fruit unknown. — (Syrrhopodon excelsus, *Sulliv. Musc. Alleghan., No.* 170.) — North Carolina; on rocks, top of Grandfather Mountain, *Gray & Sullivant:* Black Mountain, *Lesquereux.*

## 31. DRUMMÓNDIA, Hook. (Tab. 16.)

Calyptra large, cuculliform, rostrate, slightly plicate at the base, and papillose at the apex. Operculum obliquely long-rostrate from a convex base. Capsule globose-oval or slightly obovate, exsertly pedicellate. Peristome single: teeth 16, very short, truncate. Inflorescence dicœcious: male flower gemmiform. — Perennial, growing on trees; stems prostrate, throwing up numerous short branches, bearing fruit on their summit; leaves oblong, costate; areolæ minute, roundish. — (Named after the late *Thomas Drummond,* who made extensive and very valuable collections of North American Mosses.)

1. **D. clavellàta,** Hook. Stems $2'-4'$ long, creeping, densely covered with radicels; branches crowded, erect, $2''-3''$ high; leaves close, erect-patent, shortly acuminate; costa ceasing with the apex. — Grows in deep-green and close thin mats ($3'-10'$ in diameter), on the bark of trees (particularly the Beech), Northern, Middle, and Western States. (Tab. 16.)

## Tribe XIII. ORTHOTRÍCHEÆ.

## 32. ORTHÓTRICHUM, Hedw. (Tab. 16.)

Calyptra large, campanulate, longitudinally plaited, crenate-lacerate at the base, hairy or glabrous. Operculum short, conic, rostellate. Capsule pyriform, more or less elongated, apophysate, pedicellate, immersed or exserted, 8 or 16 striated, ribbed when dry. Peristome single or double, rarely wanting; the outer 16 teeth, with a medial line, mostly in pairs (often reflexed when dry); the inner 8 or 16 cilia. Inflorescence monœcious or dicœcious: male flower gemmiform. — Perennial plants, growing in roundish cushion-like tufts, on trees or rocks, never on soil; stems usually erect, simple or branched by innovations, fertile at their summit; leaves crowded, elongated, costate nearly to the point,

spreading, entire, usually revolute on the margins, of a minute dot-like areolation, except at the marginal base, the areolæ there being larger, rectangular, and pellucid. (Name from *ὀρθός, straight*, and *θρίξ, τριχός, a hair*, in allusion to the straight hairs on the calyptra.)

§ 1. *Capsule immersed or slightly exserted. Monœcious (except in No. 5 and 6).*

* *Peristome single: cilia wanting.*

1. **O. cupulàtum,** Hoffm. Stems nearly 1′ high; leaves lanceolate, keeled; capsule immersed, with 16 striæ; teeth of the peristome nearly equidistant; calyptra sparsely hairy; male flower terminal. — On rocks, Niagara Falls, *Drummond:* Lake Superior, *Agassiz.* (Eu.)

2. **O. Stúrmii,** Hoppe & Hornsch. Very like the last species; but its immersed and obovate capsule is indistinctly 8-striated; the male flower axillary. — Texas, *Wright.* (Eu.)

3. **O. anómalum,** Hedw. Separated from the preceding (to which it approaches closely) mainly by its exserted and distinctly 8-striated capsule. — Rocks, near Salem, Mass., *Lesquereux:* Lake Superior, *Agassiz.* (Eu.)

4. **O. Texànum,** Sulliv. Larger than No. 2, which it resembles, but its immersed capsule is oblong-pyriform and distinctly 8-striated; teeth of the peristome in pairs; calyptra very hairy; leaves longer, narrower, and more recurved-spreading. — Texas, *Wright:* Santa Fé, New Mexico, *Fendler.*

* * *Peristome double.*

5. **O. obtusifòlium,** Schrad. Stems 6″–10″ high; leaves when moist erect-patent, not recurved, ligulate from an oblong base, obtuse, concave, somewhat convolute on the margins, strongly papillose, the costa vanishing much below the point; capsule immersed, oblong-pyriform, the long apophysis gradually tapering into the very short pedicel; cilia of the peristome 8, composed of two rows of cellules half as wide as the teeth; calyptra glabrous. — Trees, Cambridge, Massachusetts, *Lesquereux.* (Eu.)

6. **O. exiguum,** Sulliv. Nearly related to No. 5, but much smaller; stems 3″–5″ high; leaves more acute, scarcely papillose: costa stouter, extending to the point; the areolæ at the base not so enlarged; capsule oval; the apophysis rather short; pedicel longer; cilia of the peristome 8, carinate, composed of two rows of cellules fully as broad as the teeth; operculum convex, apiculate. — Base of trees, Santee Canal, South Carolina, *Ravenel.* — The smallest of our Orthotricha. — This and the related species have, scattered on the surface of their leaves, a few articulated excrescences (*Conferva Orthotrichi*).

7. **O. Rógeri,** Brid. Leaves spreading-recurved, when moist narrowly ligulate from a ventricose concave base, canaliculate, plane on the margins above, revolute below, somewhat acute at the apex; capsule and calyptra as in No. 5; cilia 8, simple, filiform. — Trees, Lake Superior, *Agassiz.* (Eu.)

8. **O. strangulàtum,** Beauv. Stems short, compact; leaves broadly ovate-lanceolate, carinate, somewhat obtuse, the margins strongly reflexed; capsule oblong, somewhat pyriform, immersed, very much constricted below the mouth when dry; cilia of the peristome as in the last; calyptra hairy. — On trees; very common.

9. **O. Canadénse,** Br. & Sch. Differs from the preceding species in its more acute leaves, its shortly-exserted capsule smaller and not so constricted under the mouth, and in the 16 cilia of the inner peristome. — Central Ohio: rare; on trees.

10. **O. affìne,** Schrad. Larger and coarser than any of the foregoing; leaves oblong-lanceolate, rather obtuse, revolute (the upper ones rather undulate) on the margins, strongly papillose on both surfaces; capsule elliptic-oblong with a tapering apophysis, emersed; cilia as in No. 7; calyptra slightly hairy, greenish. — On rocks, Lake Superior, *Agassiz.* (Eu.)

11. **O. speciòsum,** Nees. Stems elongated, 1′–2′ high, loosely cæspitose; leaves lanceolate, keeled, with recurved margins; capsule shortly exserted, tapering into the pedicel, indistinctly striated, when dry ribbed near the mouth only; cilia of peristome 8; calyptra large, very hairy. — Trees; on banks of the St. Lawrence River. (Eu.)

12. **O. leiocárpum,** Br. & Sch. Size and mode of growth much as in the last; readily distinguished by its capsule without striæ, and entirely smooth when dry; and by the 16 large erose-articulate cilia of the peristome. — Trees, Lake Superior, *Agassiz.* (Eu.)

§ 2. *Capsule much exserted. Monœcious.*

13. **O. Ludwígii,** Schwægr. Stems mostly decumbent; leaves linear-lanceolate, somewhat fasciculate, when dry slightly twisted, the margins plane or slightly undulate; capsule pyriform, when dry very much contracted and plicate at the mouth; inner peristome absent; calyptra moderately hairy, laciniate at the base. — On trees, Alleghany Mountains. (Eu.)

14. **O. Hutchínsiæ,** Smith. Stems aggregated in rather loose tufts; leaves lanceolate, carinate, scarcely reflexed on the margins, when dry erect-appressed, not twisted; capsule subclavate, with 8 broad striæ, the apophysis gradually tapering into the long pedicel; cilia of the peristome 8; calyptra large, copiously hairy. — Rocks; common in mountainous districts. (Tab. 16.) (Eu.)

15. **O. crìspum,** Hedw. Stems closely tufted; leaves linear-lanceolate from a dilated base, much contorted and crisped when dry, slightly undulated; capsule clavate, when dry constricted under the mouth, with 8 strong ribs continued down the very long tapering apophysis; peristome with 8 cilia of a double row of cellules; calyptra very hairy; sporules brown. — Trees, Alleghany Mountains. (Eu.)

16. **O. crìspulum,** Hornsch. More delicate than the last; leaves narrower and less crisped when dry; capsule shorter, pale, of thin texture, when dry not contracted below the mouth, its ribs less distinct; apophysis shorter, passing more abruptly into the pedicel; sporules green. — Trees, Alleghany Mountains. (Eu.)

17. **O. Brùchii,** Brid. Very closely allied to the last two species; from No. 15 it differs in its less crisped leaves, and deeper-colored larger capsule; from No. 16, by the narrowed mouth of the capsule and the much longer apophysis; from both by its longer pedicel, and the cilia of the peristome of but one row of cellules. — White Mountains, N. Hampshire, *Oakes:* rare. (Eu.)

### 33. MACROMÍTRIUM, Brid. (Tab. 16.)

Calyptra large, conic-mitriform, longitudinally plicate or sulcate, more or less laciniate at the base, hairy or glabrous. Operculum subulate-rostrate from a conic base. Capsule erect-ovate, oval or oblong, long-pedicellate. Peristome double or single, sometimes wanting; the exterior 16 teeth lanceolate, usually in pairs; the interior a more or less exserted membrane, truncate or cut to the base into 16 or more cilia. — Stems creeping; branches erect, crowded, fertile at their summit; leaves lanceolate-oblong, continuously costate, with a dense and minute dot-like areolation above, enlarged rectangular and pellucid below. (Name from *μακρός, long,* and *μιτρίον, a veil,* referring to the very large calyptra.)

1. **M. Drégei,** Hochstetter? Stems slender, 1′–2′ long, creeping, subpinnately branched; branches short, erect; leaves crowded, erect-patent, ovate-lanceolate, papillose, recurved on the margins, ventricose-concave at base, canaliculate above; capsule oval-oblong; peristome single (the exterior wanting), a short truncate membrane; calyptra hairy. — Top of Jonah Mountain, Georgia, *Lesquereux;* on the bark of old pine-trees. — We have seen Cape of Good Hope specimens apparently identical with ours, referred doubtfully to M. tenue and M. Dregei. (Tab. 16.)

### 34. SCHLOTHEÌMIA, Brid. (Tab. 16.)

Calyptra large, conic-mitriform, scabrous at the apex, with 4 or more inflexed lobes or appendages at the base. Operculum conic-subulate. Capsule subcylindrical, erect, pedicellate. Peristome double; the exterior 16 teeth in pairs, linear-lanceolate (when dry revolute); the interior 16 or more irregular cilia. — Mode of growth, habit, and structure of leaves very much as in the last genus: both genera being the tropical analogues of Orthotrichum, and remarkable for the ferruginous or reddish-brown color usually predominant in their foliage. — (Named for *Count Schlotheim.*)

1. **S. Sullivántii,** C. Mull. Monœcious; branches short; leaves very crowded, ovate-oblong, obtuse, apiculate, rugose-undulate above, the costa ceasing below the point. — Grows in compact, rigid, dark-brown mats, on trees. — Lower portion of the Southern States. (Tab. 16.)

## Tribe XIV. PTYCHOMITRIÈÆ.

### 35. PTYCHOMÍTRIUM, Br. & Sch. (Tab. 16.)

Calyptra campanulate, plicate, deeply laciniate at the base. Operculum conic-subulate. Capsule oval, erect, annulate, pedicellate. Peristome single: teeth 16, perforated or fissile into two unequal filiform segments. Inflorescence monœcious. — Perennial plants, growing on rocks and trees: in habit and aspect intermediate between Orthotrichum and Grimmia. — (Name from *πτύξ, πτύχου, a fold,* and *μιτρίον, a veil,* referring to the plicate calyptra.)

1. **P. incúrvum,** Schwægr. Stems 2″–3″ high, aggregated; leaves crowded, oblong, ligulate, spreading, slightly incurved at the obtuse and somewhat cucullate apex, concave, costate nearly to the point, of a rather thick tex

ture, composed of minute and somewhat quadrate cellules; capsule rotund-oval, its mouth small; teeth of the peristome often divided to the base; annulus large, unrolling. — (Musc. Alleghan., No. 135.) — On rocks, Pennsylvania and southward. (Tab. 16.)

2. **P. Drummóndii,** Hook. & Wils. Somewhat larger than the preceding; leaves linear-lanceolate, acute, crisped when dry; teeth of the peristome more or less perforated, inserted below the mouth of the oblong-oval capsule; annulus none. — On trees, Southern States.

## Tribe XV. GRIMMIÈÆ.

### 36. SCHISTÍDIUM, Br. & Sch. (Tab. 16.)

Calyptra small, not extending to the mouth of the capsule, conic-mitriform and lacerate at the base, or cuculliform and entire at the base. Operculum depressed-convex, papillate or shortly rostellate, deciduous with the columella attached. Capsule roundish-oval, oval-oblong, or obovate, wide-mouthed, immersed, with a short erect pedicel. Peristome single: teeth 16, lanceolate, cribrose. Inflorescence monœcious: male flower gemmiform. — Growing in circular more or less compact tufts, on rocks (chiefly mountainous); stems simple, or dichotomously branched and fastigiate; leaves of a rigid and rather brittle texture, crowded, spreading, ovate-lanceolate, acuminate, concave below, channelled above, usually reflexed on the margins, continuously costate, mostly tipped with a pellucid hair-point; areolæ minute and nearly quadrate, those at the base larger, oblong and diaphanous. — (Name from $\sigma\chi\acute{\iota}\zeta\omega$, *to split*, the base of the calyptra being laciniated.)

1. **S. apocárpum,** Br. & Sch. Loosely cæspitose; stems ½′–1′ long, upper leaves usually with white points; capsule elliptical, firm; teeth of peristome sometimes entire, purplish-red; annulus none; calyptra 5-lobed at the base. — On rocks, very common. — Foliage blackish-green: subject to numerous forms, dependent on locality. (Tab. 16.) (Eu.)

2. **S. marítimum,** Br. & Sch. More robust than the last, densely tufted; leaves longer, narrower, more rigid, never hair-pointed, the margins plane, the costa stouter and shortly excurrent; capsule obovate, truncate; sporules twice as large; calyptra the same. — On rocks near the sea, Eastport, Maine, *J. L. Russell.* (Eu.)

3. **S. confértum,** Br. & Sch. Resembles No. 1 exceedingly; tufts more compact; leaves less lurid, their margins not so recurved; capsule oval or roundish, of a thinner texture, paler-colored, almost pellucid; teeth of the peristome more cribrose and lacerated, and of an orange color; calyptra the same. — New England, *Oakes.* — A variety with obtuse leaves occurs on the White Mountains. (Eu.)

4. **S. ambíguum,** Sulliv. Near the preceding, but has larger and elliptic-lanceolate perichætial leaves, with a long, flexuous, dentate, pellucid hair-point; capsule oval-oblong; calyptra cuculliform. — (*Mem. Amer. Acad. Art. and Sci. n. ser.* 4, p. 170.) — Dry rocks, Santa Fé, N. Mexico, *Fendler.*

## 37. GRÍMMIA, Ehrh. (Tab. 16.)

Calyptra as in Schistidium, but larger and extending below the mouth of the capsule. Operculum conic-obtuse, or conic-rostrate, deciduous without the columella. Capsule ovate, oval, or nearly cylindrical, with an erect and curved or flexuous pedicel. Peristome single: teeth 16, lanceolate, cribrose, and 2–3-fid above. Inflorescence monœcious or diœcious. — Habit and mode of growth strongly resembling Schistidium and Racomitrium. Habitat, on rocks. — (Named after *Grimm*, a German botanist.)

1. **G. leucophæa,** Grev. Diœcious; stems 6″–10″ high, compactly cæspitose; leaves widely spreading, ovate or ovate-oblong, concave, plane on the margins, suddenly tapering into a very long pellucid dentate hair-point; capsule oval or oblong, erect, exserted; teeth of the peristome deeply 2–3-cleft; annulus large, unrolling; operculum short or long conic-rostellate; calyptra mitriform, 5-lobed at the base. — Sandstone rocks, S. Ohio. (Tab. 16.) (Eu.)

2. **G. Ólneyi,** Sulliv. Diœcious; tufts loose, stems 5″–10″ high, yellowish-green, linear-lanceolate, gradually tapering into a long diaphanous serrated hair-point; capsule oval or ovate-oval, not ribbed when dry, oblique or horizontal on an exserted curved pedicel; teeth of the peristome perforated above; annulus compound; operculum with a conic base and an oblique rostrum; calyptra cucullifform, 2–3-fid at the base. — Rocks, Rhode Island, *S. T. Olney.* — Approaches closely to G. trichophylla, *Grev.*; but that is a rather more slender plant; its leaves longer and more flexuous, with a smooth hair-point; capsule regularly and strongly ribbed when dry, pendulous on a longer and more curved pedicel; teeth of the peristome bifid; rostrum of the operculum straight; calyptra mitriform; annulus larger.

3. **G. Pennsylvánica,** Schwægr. Diœcious; loosely cæspitose; stem 1′ or more long; leaves much as in No. 2, but dark green, and with a stouter costa; capsule immersed, erect on a short pedicel, oval-oblong, smooth when dry; operculum conic-rostellate; calyptra mitriform, lobed. — On rocks, Alleghany Mountains; common: fruit rare. — Larger than any of the preceding.

4. **G. Donniàna,** Smith. Monœcious; tufts compact, small, hemispherical, hoary; stems 3″–4″ high; leaves linear-lanceolate, with a long and rough hair-point, their margins plane; capsule oval-oblong, shortly exserted on an erect pedicel; annulus rather narrow; operculum conic-obtuse; calyptra mitriform, lobed. — (G. obtusa, *Schwaegr.*) — White Mountains of New Hampshire, *Oakes.* (Eu.)

## 38. COSCÍNODON, Spreng. (Tab. 18.)

Capsule large, campanulate, plicate, crenate at the base. Operculum conic, acute or shortly rostellate. Capsule obovate or oval-oblong, immersed, erect, short-pedicellate, annulate. Peristome single: teeth 16, equidistant, lanceolate, very much cribrose, reflexed when dry. Inflorescence monœcious or diœcious: male flower gemmiform. — Combines the characters of Orthotrichum and Grimmia; the habit and structure of the foliage being that of the last-named genus.

(Name from *κόσκινον, a sieve,* and *ὀδών, a tooth,* in allusion to the perforated teeth of the peristome.)

1. **C. Wrightii,** Sulliv. Monœcious; tufts compact, hoary; stems 3″–4″ high, elavate; leaves closely imbricating (the lower smaller, oval, the upper larger, obovate), very concave, serrate above, suddenly produced into a long hyaline denticulate hair-point, costate half-way; areolæ at the base oblong, those near the apex oval, both pellucid, the central ones roundish and chlorophyllose; capsule oblong-oval, truncate at the base, on a very short curved pedicel; operculum conic-acute; annulus large, compound. — Rocks, near San Marcos, Texas, *Wright.* — C. pulvinatus, its only congener, has a straight and longer pedicel, obovate capsule, lanceolate leaves, and is dioœcious. (Tab. 18.)

## 39. RACOMÍTRIUM, Br. & Sch. (Tab. 16.)

Calyptra conic-mitriform, subulately rostrate, solid and papillose at the apex, membranous and multifid at the base. Operculum conic, with a short or long subulate rostrum. Capsule elliptical, nearly cylindrical or ovate-oblong, erect, smooth, long-pedicellate. Peristome single: teeth 16, 2–3-fid, the segments free or somewhat cohering. Inflorescence dioœcious. — Tall, striking species, the largest among the Grimmioid Mosses; stems dichotomously or irregularly branched; leaves oblong-lanceolate, with or without a diaphanous hair-point, costate-carinate; areolæ above mostly quadrate, below enlarged, linear, with a sinuous outline. (Name from *ῥάκος, a shred,* and *μιτρίον, a veil,* referring to the lacerate base of the calyptra.)

§ 1. DRÝPTODON, Br. & Sch. — *Ramification dichotomous; the innovations simple, fastigiate.*

1. **R. aciculàre,** Brid. Loosely cæspitose, dull green; stems procumbent and leafless below, ascending, 1′–3′ long; leaves crowded, spreading every way or secund, ovate-oblong, the costa vanishing below the toothed or entire obtuse point; capsule elliptic-oblong, its mouth small; teeth of peristome deeply 2–3-fid; operculum long, subulate-rostrate. — On wet rocks, Alleghany Mountains. (Eu.)

2. **R. Sudéticum,** Br. & Sch. Patches loose, grayish or lurid; stems as in the last; leaves from an erect base, spreading, recurved or incurved, linear-lanceolate, with a rather short denticulate pellucid hair-point; capsule small, oval or elliptic-oblong on a short erect or curved pedicel; operculum shortly rostrate. — Exposed rocks, Alleghany Mountains. (Eu.)

§ 2. RACOMITRIUM Proper. — *Ramification irregular; branches ramulose; the innovations not fastigiate.*

3. **R. fasciculàre,** Brid. Patches loose, of a light green color; stems 1′–2′ long, assurgent, branched; branches with numerous fasciculate short branchlets; leaves crowded, spreading, linear-lanceolate, tapering, without a pellucid hair-point, margins reflexed, the areolæ above and below elongated and sinuous; capsule elliptical; rostrum of the calyptra strongly papillose its whole length; teeth of the peristome bifid to the base, slender, nodulose. — Moist rocks, Alleghany Mountains. (Tab. 16.) (Eu.)

4. **R. microcárpum,** Brid. Tufts rather compact; stems slender, fasciculately branched, with numerous short branchlets; leaves yellowish, spreading, recurved or falcate-secund, lanceolate, tapering, with a short diaphanous remotely serrated hair-point; areolæ everywhere elongated and sinuous; capsule small, oblong; teeth of the peristome short. — Dry rocks, Alleghany Mountains. (Eu.)

5. **R. lanuginòsum,** Brid. Patches loose, extensive, hoary; stems much elongated (4′–10′), slender, flexuose, fragile, with fasciculate branches; leaves crowded, erect-patent, rather flexuous, linear-lanceolate, tapering into a long diaphanous erose-dentate hair-point; areolæ elongated and sinuous; capsule small, ovate-oval, on a short scabrous pedicel; teeth of peristome very long, 2-cleft, filiform. — Rocks, White Mountains, New Hampshire, *Oakes.* (Eu.)

6. **R. canéscens,** Brid. Patches loose, large, yellowish-green or hoary; stems 2′–4′ long, more or less fasciculately branched; leaves spreading, recurved, ovate-lanceolate, with a short erose-denticulate hair-point, papillose on both surfaces, the margins recurved; areolation as in No. 5; capsule ovate-oblong, on a long smooth pedicel; teeth of the peristome as long as the capsule, very slender, 2-parted, nodulose. — With the last, *Oakes.* (Eu.)

## Tribe XVI. HEDWIGIÈÆ.

### 40. HEDWÍGIA, Ehrh. (Tab. 16.)

Calyptra small, conic, smooth, sometimes hairy. Operculum plano-convex, with or without a central papilla. Capsule globose, erect, entirely immersed, very short-pedicellate. Peristome none. Inflorescence monœcious: male flower gemmiform, axillary. — Habit and mode of growth like Schistidium: stems dichotomously or irregularly branched; leaves spreading, ovate-lanceolate, papillose, not costate, the apex diaphanous, erose-denticulate or fringed on the margins; cellules at the central base elongated and subflexuous, elsewhere small and quadrate. (Dedicated to the distinguished cryptogamist, *J. G. Hedwig.*)

1. **H. ciliàta,** Ehrh. Stems 1′–4′ long, rooting at the base only; leaves sometimes secund, with a longer or shorter diaphanous point. — On rocks and bowlders; very common, forming large and hoary glaucous-green patches. (Tab. 16.) (Eu.)

## Tribe XVII. BUXBAUMIÈÆ.

### 41. BUXBAÙMIA, Haller. (Tab. 17.)

Calyptra cylindrical-campanulate, small, covering the operculum only. Operculum small, conic, obtuse. Capsule large, elongated-ovate, oblique, flat on the upper side, convex and gibbous underneath, apophysate, long-pedicellate. Peristome double (?); the exterior an irregularly incised membrane, composed of 3 or 4 layers of elongated cellular tissue, or 16 linear moniliform papillose teeth; the interior a whitish and conic plaited membrane. Inflorescence monœcious: male flower gemmiform; antheridium solitary, roundish. — Minute annuals or biennials; stems scarcely any, partly buried in the soil: leaves few (5 or 6), scale-

like, broad-ovate, deeply cut and long-ciliated on the margins, not costate, loosely reticulated. (Named after *J. C. Buxbaum*, an early German botanist.)

1. **B. aphýlla,** Haller. Stem and leaves having the appearance of a minute hairy bulb, many times smaller than the capsule with its short cylindrical apophysis; pedicel rather stout, 7″–10″ high, tuberculate. — New England and New York; rare. (Tab. 17.) (Eu.)

### 42. DIPHÝSCIUM, Weber & Mohr. (Tab. 17.)

Calyptra small, conic, entire at the base, scarcely covering the elongated-conic operculum. Capsule large, ovate, oblique, gibbous, subsessile, immersed. Peristome double (?); the exterior a very narrow slightly dentate ring, quite rudimentary; the interior as in Buxbaumia. Inflorescence dicœcious: male flower terminal, gemmiform; antheridia numerous, paraphysated. — Small bulb-like mosses, annual or biennial, the sessile capsule forming the principal part; stem very short, its leaves lingulate, spreading, entire, costate, thick and fleshy; the perichætial leaves much larger, membranous, erect, lanceolate, ciliate-laccrate at the point, the costa excurrent into a long serrulate awn. (Name from *δίς, twice,* and *φυσκίον, a vesicle;* the wide separation of the thecal and sporangial membranes giving the appearance of one vesicle within another.)

1. **D. foliòsum,** Web. & Mohr. Whole plant 3″–4″ high. — Clayey or barren soil; not unfrequent in hilly districts. (Tab. 17.) (Eu.)

## Tribe XVIII. POLYTRÌCHEÆ.

### 43. ÁTRICHUM, Beauv. (Tab. 17.)

Calyptra narrowly cuculliform, naked, spinulose at the apex. Operculum hemispherical at the base, with a long slender rostrum. Capsule cylindrical or oblong, nearly erect, slightly arcuate, long-pedicellate. Peristome single: teeth 32, short, ligulate, obtuse, incurved and adhering by their summits to the margin of the disk-like apex of the columella. Inflorescence monœcious or dicœcious: male flower cup-shaped. — Intermediate in habit between Polytrichum and Mnium; the flowering stems erect, simple or branched, from a creeping rhizoma; leaves small below, much larger and elongated above, crisped when dry, of a minute firm hexagonal areolation, the percurrent costa bearing on its upper surface 2 or 3 narrow lamellæ. — (Name from *α* privative, and *θρίξ, τριχός, a hair,* in allusion to the naked calyptra.)

1. **A. undulàtum,** Beauv. Stems erect, mostly simple; leaves long ligulate-lanceolate, undulate, spinulose-toothed, narrowly margined, the costa with 2–4 narrow lamellæ. (Catherinea undulata, *Brid.*) — Moist clay-banks, in hilly districts; rare. — Monœcious: fertile flower terminal on a prolongation of the axis of the sterile flowers. (Eu.)

2. **A. angustàtum,** Beauv. More slender than the preceding; leaves narrower, more densely reticulated, not denticulate below the middle, the costa with more numerous and broader lamellæ. — Shady woods, and margins of swamps; common. — Dicœcious: male flower terminal. (Tab. 17.) Eu.)

3. **A. crispum,** T. P. James. More robust than either of the foregoing; stems simple, lower leaves small, somewhat spatulate; the upper much larger, oblong-lanceolate, inclining to spatulate, slightly undulate, with a thickened dentate border, the costa percurrent, scarcely lamellate; areolæ rather large, hexagonal-rotund; capsule obovate-oblong, erect-cernuous, its mouth ample; teeth of the peristome very short, somewhat irregular; pedicel stout, red: dicœcious. — Banks of small streams, New Jersey, *James.* — A very distinct species.

## 44. POGONÀTUM, Beauv. Hair-cap Moss. (Tab. 17.)

Calyptra cuculliform, very hairy; the hairs forming a dense mat, covering the whole capsule. Operculum rostellate from a convex base. Inflorescence dicœcious: male flower cup-shaped. — Mode of growth as in Atrichum; leaves more rigid, spreading from a sheathing base, lanceolate, the costa below narrow, above very broad and covered with numerous crowded lamellæ. — (Name from πώγων, *a beard;* from the hairy calyptra.)

* *Stems extremely short.*

1. **P. brevicaùle,** Brid. Stems 2″–3″ high; leaves few, erect-appressed, the lower ovate-acute, the upper narrowly lanceolate from a broad base, erose-denticulate above; capsule cylindrical, erect; operculum shortly rostellate; calyptra whitish. — Moist clayey banks, Eastern States and westward. — The ground around is always covered by a green stratum of confervoid filaments.

2. **P. brachyphýllum,** Michx. Much like the last; stems shorter; leaves oval-oblong, obtuse, entire; capsule oblong, cernuous; calyptra brownish. — On the ground, road-sides, &c., Southern States.

* * *Stems elongated.* (*Alpine species.*)

3. **P. urnígerum,** Brid. Stems divided above; leaves lanceolate from a short sheathing base, pointed, serrate, the lamellæ of the costa abruptly thickened on their borders; capsule cylindrical, the surface granulated. — White Mountains, New Hampshire. — Plant 2′–4′ high. (Tab. 17.) (Eu.)

4. **P. capillàre,** Brid. Very like the preceding, but a smaller plant; leaves oblong, approaching to spatulate, pointed, more loosely placed on the stem; pedicels more slender; rostrum of the operculum rather flexuous; teeth of the peristome more linear, their basal membrane conspicuously emergent. — White Mountains, New Hampshire.

5. **P. alpìnum,** Brid. Stems much elongated, fastigiately branched above; leaves linear-lanceolate from a long sheathing base, serrate; lamellæ of the costa gradually thickened at their margins; capsule erect or oblique, oval-oblong, the surface smooth. — White Mountains, New Hampshire. — Larger than any of the above. (Eu.)

## 45. POLÝTRICHUM, Brid. Hair-cap Moss. (Tab. 17.)

Calyptra and operculum as in the last. Capsule 4–6-sided, oblong or ovate, with a discoid apophysis, erect (when dry horizontal), long-pedicellate. Peristome single: teeth 64: — otherwise as in Atrichum; with the inflorescence and mode of growth of Pogonatum. — Tall showy Mosses, among the largest of the

*Acrocarpi;* stems firm from a suberect rhizoma (hence forming more compact tufts), almost woody, triangular, dark purple, shining; leaves rigid and coriaceous, linear-lanceolate, below sheathing, above spreading, and mostly occupied by the broad lamelligerous costa. (Name from πολύς, *many*, and θρίξ, τριχός, *a hair;* from the hairy covering of the calyptra.)

1. **P. commùne,** Linn. Stems erect, mostly simple; leaves spreading or recurved, flat, serrate on the margins and back; the lamellæ somewhat 2-cleft at their margins; capsule oblong, 4-sided, the angles acute; operculum shortly rostrate from a convex base. — Shady moist places; common. — Plant 6′ – 12′ high. (Tab. 17.) (Eu.)

2. **P. formòsum,** Hedw. Differs from the preceding by its longer and slightly curved capsule with obtuse angles, a smaller obconic apophysis tapering into the pedicel, and the conical operculum. — Woods, around the base of trees, &c. (Eu.)

3. **P. grácile,** Menzies. Usually somewhat smaller than No. 1 or 2; capsule ovate, 4 – 6-sided, obtuse-angled; operculum long-rostrate; the hairy covering of the calyptra shorter than the capsule; spores larger; basal membrane of the peristome not emergent. — Boggy places, Ipswich, Massachusetts, *Oakes.* (Eu.)

4. **P. juniperìnum,** Hedw. Stem simple or divided; leaves linear-lanceolate, awn-pointed, denticulate on the back, the margins inflexed, entire; capsule and operculum as in No. 1. — Var. STRICTUM. Stems elongated, slender; leaves appressed; capsule cubical. — Margins of woods, in exposed places, &c. — Plant 4′ – 7′ high; the variety subalpine. (Eu.)

5. **P. piliferum,** Schreb. Stems simple; leaves clustered at the summit, lanceolate, the margins inflexed, entire; costa excurrent into a long diaphanous and spinulose awn; capsule ovate-oblong, 4-sided; operculum conical, rostrate. — Rocky places, in mountainous districts. — Plant 2′ – 4′ high. (Eu.)

## TRIBE XIX. BRŸEÆ.

### 46. TÍMMIA, Hedw. (Tab. 17.)

Calyptra large, cuculliform. Operculum hemispherical, papillate or with a central depression. Capsule oblong, subpyriform, erect-cernuous, broadly annulate, long-pedicellate. Peristome double; the exterior of 16 lanceolate geniculate-incurved teeth; the interior, a membrane divided half-way into 64 cilia coherent in fours at their apices. Inflorescence monœcious: male flower gemmiform, axillary. — Partaking more or less of the characters of Mnium, Aulacomnion, and Polytrichum; stems cæspitose, ascending from a decumbent radiculose base, innovating sparingly above; leaves of a firm and rather rigid texture, sheathing at the base, elongated-lanceolate, spreading, strongly dentate, with a stout and terete percurrent costa; areolæ rotund above, elongated-hexagonal below. (Named after *J. C. Timm,* a German botanist.)

1. **T. megapolitàna,** Hedw. — The calyptra is often arrested in its growth, and found attached to the pedicel, having given egress to the capsule by

a lateral fissure not extending through its tubular base. — Shady banks of watercourses; not uncommon. (Tab. 17.) (Eu.)

### 47. AULACÓMNION, Schwægr. (Tab. 17.)

Calyptra cuculliform. Operculum shortly and obtusely rostellate from a convex base. Capsule oblong, cernuous, striate (ribbed when dry), long-pedicellate, annulate. Peristome as in Bryum, but with ciliolæ (2 or 3 together) always present. Inflorescence monœcious or dicœcious. — Plants having, besides a peculiar habit of their own, a mixed resemblance to species of Mnium, Bartramia, and Meesia; stems erect, tomentose; upper portion of the branches in some species elongated, leafless, pedicel-like, and terminated by capitula of rudimentary leaves (pseudopodia); leaves oblong or linear-lanceolate, costate nearly to the apex, with a granular dot-like areolation. (Name from *αὖλαξ, -ακος, a furrow*, and *μνίον, a moss*, in allusion to the furrowed or ribbed capsule.)

1. **A. heteróstichum,** Br. & Sch. Leaves obovate-oblong, strongly serrate, turned to one side; capsule cylindrical-oblong, slightly curved; operculum obliquely rostellate. — Woods, moist shady banks, &c.; common. — Monœcious; sterile flower gemmiform, axillary: pseudopodia wanting. (Tab. 17.)

2. **A. túrgidum,** Schwægr. Leaves ovate-oblong, obtuse, entire; capsule curved, somewhat gibbous. — White Mountains of New Hampshire. — Dicœcious: sterile flower discoid: presence of pseudopodia doubtful.

3. **A. palústre,** Schwægr. Leaves elongated-lanceolate, denticulate at the apex; capsule cernuous, ovate-oblong, gibbous at the back. — Borders of swamps; not unfrequent. — Inflorescence as in No. 2: pseudopodia less frequent than in the next species. (Eu.)

4. **A. andrógynum,** Schwægr. Dicœcious; a miniature resemblance of the preceding species; distinguished by its gemmiform male flower and oblong, regular, inclined capsule: pseudopodia more abundant and fruit more rare. — Chimney Rocks, on the French Broad River, Tennessee. (Eu.)

### 48. BRŸUM, Br. & Sch. (Tab. 18.)

Calyptra small, cuculliform, fugacious. Operculum convex, apiculate or shortly rostellate. Capsule pyriform, clavate or oblong, with a tapering neck or apophysis, inclined or pendulous, long-pedicellate, mostly annulate. Peristome double; the exterior 16 lanceolate teeth, with a flexuous medial line, hygroscopic; articulation close, internally prominent: the interior a membrane divided half-way into 16 carinate processes or cilia, alternating with the teeth; intermediate ciliolæ (1–3 together) mostly present. Inflorescence various: male flower with filiform paraphyses. — A very natural genus, containing numerous species, growing on the ground or on rocks, seldom on trees; stems closely cæspitose, erect, sparingly branched by innovations from the floral apex; leaves enlarged as they ascend, usually of an ovate or lanceolate outline, with a percurrent costa, smooth texture, and rather large rhomboidal areolation (*Βρύον*, an ancient name for Moss.)

* *Leaves narrow, elongated; the costa ceasing below the apex.*

\+ *Inflorescence hermaphrodite.*

1. **B. pyrifórme,** Hedw. Stems short (3″–4′), simple; leaves bright shining green, spreading, linear-setaceous, subflexuous, slightly serrate at the apex; capsule pyriform, pendulous, glossy, yellowish-brown, of a thin texture; operculum convex, mammillate; pedicel long. — Mostly on the ground in burnt woods, &c.; frequent. (Eu.)

2. **B. crùdum,** Schreb. Patches glaucous-green, somewhat loose; stems 1′–2′ high; lower leaves oval-lanceolate, the terminal linear-lanceolate, subflexuous, serrated at the apex; capsule oval-pyriform or oblong, suberect or horizontal; operculum as in No. 1. — White Mountains, New Hampshire, *Oakes* — Sometimes dicœcious. (Eu.)

\+ \+ *Inflorescence dicœcious: male flower gemmiform, terminal.*

3. **B. Lescuriànum,** Sulliv. Loosely cæspitose, greenish-yellow, without any tinge of red; stems 4″–6″ long, subdecumbent; lower leaves oblong-lanceolate, the terminal much longer, linear, acuminate, serrate at the apex, the margins reflexed at the middle; capsule short, pyriform, pendulous, when dry wide-mouthed; annulus compound, unrolling; operculum hemispherical, apiculate; pedicel erect from a geniculate base, 7″–8″ long. — (*Mem. Amer. Acad.*, n. ser. 4, p. 171.) — Clay-banks, Ohio and Pennsylvania: rare.

4. **B. annótinum,** Hedw. Plant considerably larger than the preceding; capsule oblong-pyriform, with a long, tapering, reddish neck, and constricted under the mouth when dry. — Mountains of New England, *Oakes*. — The sterile shoots have numerous axillary, deciduous, bulb-like gemmæ. (Fu.)

\+ \+ \+ *Inflorescence monœcious: antheridia axillary.*

5. **B. elongàtum,** Dicks. Stems simple, 4″–10″ high; upper leaves linear-lanceolate, crowded, spreading, recurved on their lower margin, serrated at the apex; capsule inclined or horizontal, elongated, narrowly clavate, the collum very long; operculum subrostellate; pedicel 1′–2′ long. — Crevices of rocks, tops of high mountains in the Southern States. — Ciliolæ of the inner peristome often rudimentary. (Eu.)

6. **B. nùtans,** Schreb. Stems about 1′ long; upper leaves linear-lanceolate, serrulate at the apex, the margins below recurved; capsule pendulous, oval-pyriform or elliptical, short-necked; operculum apiculate; ciliolæ of the inner peristome in twos or threes, large, appendiculate; pedicel 1′–2′ high, pale above. — Moist sandy soil, in hilly or mountainous districts. (Eu.)

7. **B. cucullàtum,** Schwægr. An alpine species, often confounded with alpine forms of the last species; its most reliable distinctive characters are the larger obovate capsule, with a small operculum, and the absence of the ciliolæ of the inner peristome. — White Mountains of New Hampshire, *Gray, Oakes*. (Eu.)

* * *Leaves broad; costa ceasing below the apex.* (*Dicœcious: male flower terminal.*)

8. **B. ròseum,** Schreb. Stems 1′–2′ long, decumbent at the base; lower leaves small, appressed, the upper very large, serrated, spatulate, apiculate, forming terminal stellate clusters; capsule pendulous, clavate-oblong or sub-

cylindrical, slightly curved, short-necked; pedicels 1–5 from the same perichæth; male flower somewhat discoid. — Shaded woods, at the base of trees: common. — Among the largest of the genus. (Eu.)

9. **B. Wahlenbérgii,** Schwægr. Patches extensive, pale glaucous-green; stems erect, or decumbent at the base, 1′–2′ long; leaves serrate, the lower ones ovate-acuminate, the uppermost lanceolate, serrate at the apex, with a rather loose areolation; capsule short-pyriform, pendulous, short-necked, when dry wide-mouthed; annulus none; male flower somewhat discoid, conspicuous, on a slender stem. — Springy and gravelly places; not uncommon: but the fruit rare. (Eu.)

10. **B. argénteum,** Linn. Patches silvery-white; stems 4″–10′ high, divided; branches julaceous; leaves very concave, entire, loosely areolated; the lower distant, broadly ovate; the upper ovate-lanceolate, imbricating; capsule abruptly pendulous, oval-oblong, deep purple when ripe. — On exposed ground, roofs, pavements, &c.: extremely common. — A small species. (Eu.)

* * * *Leaves mostly ovate; the costa extending to the apex.* (*Dioicous.*)

11. **B. pseudo-triquètrum,** Schwægr. Patches large, deep green, inclining to blackish or purplish; stems 1′–3′ high, radiculose; leaves ovate and ovate-lanceolate, slightly bordered, the margins recurved, slightly serrulate at the apex; capsule pendulous, oblong-pyriform, with a tapering neck. — Wet rocks, in hilly districts, Southern Ohio. — Resembles B. bimum, but is more robust, and with a different inflorescence. (Eu.)

12. **B. turbinàtum,** Hedw. Patches pale green, sometimes with a reddish tinge; stems 1′–2′ long; leaves ovate-acuminate and oblong-lanceolate, subdecurrent, slightly recurved on the margins, the marginal cellules long and narrow; capsule ventricose-pyriform, very much constricted under the mouth when dry. — Wet rocks, below Niagara Falls. (Eu.)

13. **B. Duvàlii,** Voit. Distinguished from the preceding (some forms of which it much resembles) by its more slender stems; its remote, spreading, very much decurrent, less elongated leaves, of a looser areolation and with plane margins; capsule less constricted under the mouth when dry. — Mountains of New England, *Oakes.* (Eu.)

14. **B. alpìnum,** L. Tufts dense, deep red, shining; stems (½′–2′ high) stiff; leaves lanceolate, nearly erect, closely imbricating, straight, recurved on the margins; costa strong, rigid; capsule oblong-pyriform, pendulous, deep red. — Alpine region of the White Mountains, New Hampshire, *Oakes.* (Eu.)

* * * * *Leaves ovate; the costa excurrent.*

← *Inflorescence hermaphrodite.*

15. **B. cérnuum,** Hedw. Closely cæspitose; stems branched, radiculose; leaves ovate-acuminate, concave, with recurved margins; capsule pendulous, oblong-pyriform, the mouth and operculum very small; inner peristome imperfect, adherent to the teeth. — Wet woods, Northern Ohio. (Eu.)

16. **B. bìmum,** Schreb. Stems 1′–2′ long, matted by the purplish radicels; leaves above yellowish or lurid-green, below reddish-brown, ovate-

lanceolate, spreading, subdecurrent, somewhat margined, slightly serrated at the apex; capsule pendulous, oblong-pyriform, mouth and operculum rather large; inner peristome perfect. — About the roots of trees, on the borders of swamps; Ohio. (Tab. 18.) (Eu.)

17. **B. intermèdium,** Brid. Densely cæspitose; stems short (3″–6″ high); leaves ovate-acuminate and ovate-lanceolate, imbricated, erect, their margins reflexed, the excurrent portion of the costa sometimes denticulate; capsule somewhat pendulous, oblong-pyriform; inner peristome perfect. — Crevices of shaded limestone cliffs, Ohio; and on brick walls, near the Santee Canal, South Carolina. (Eu.)

18. **B. torquéscens,** Br. & Sch. Much like the last; but distinguished by its leaves contorted when dry, and its larger, clavate-obconic, somewhat pendulous capsule, usually incurved. — Texas, *Wright.* (Eu.)

+ + + *Inflorescence dicœcious: male flower gemmiform, terminal.*

19. **B. capillàre,** Hedw. Stems ¼′–1 long, rather closely tufted; leaves strongly contorted when dry, narrowly margined, the lower ovate-oblong, apiculate; the upper obovate-oblong with slender points; capsule rather pendulous, variable, oval-pyriform, oblong-clavate, or short-obovate; operculum red. — On rocks, road-sides, mountains of Pennsylvania, *Lesquereux:* rare. A variable species. (Eu.)

20. **B. cæspiticium,** L. Tufts compact; stems ¼′–1′ long; leaves straight when dry, ovate-acuminate and ovate-lanceolate, the margins reflexed; capsule usually oblong-obovate or pyriform, pendulous; operculum yellow. — On the ground, rocks, &c., in dry places: frequent. (Eu.)

21. **B. atropurpùreum,** Web. & Mohr. Smaller than the last; stems densely crowded; leaves ovate-acute and ovate-lanceolate, erect-patent, concave, reflexed on the margins; capsule pendulous, dark purple, oval-oblong, not pyriform, the neck abruptly passing into the pedicel; operculum wider than the mouth of the capsule. — Sandy soil, among the Lookout Mountains, Alabama, *Lesquereux.* (Eu.)

22. **B. sanguíneum,** Ludwig. Distinguished from the last species, which it much resembles, by its leaves more elongated, longer-cuspidate, plane on the margins, and serrate at the apex; capsule deep blood-red, oblong-pyriform, the neck gradually tapering into the pedicel; the operculum more pointed. — With No. 21. (Eu.)

+ + + *Inflorescence monœcious: male flower gemmiform, terminal on proper branches.*

23. **B. uliginòsum,** Br. & Sch. Cæspitose; stems short (3″–7″ high), radiculose; leaves oval-lanceolate, the margins plane above and with narrow cellules; capsule pendulous, clavate, not pyriform, irregular, gibbous on the back near the small oblique mouth; cilia of the inner peristome wanting or rudimentary. — Wet woods, Northern Ohio, *Lesquereux.* — Foliage green. (Eu.)

24. **B. pallèscens,** Schwægr. Stems 1′–2′ high, compactly tufted; leaves ovate-lanceolate, the margins reflexed; capsule oblong-pyriform, symmetrical, pendulous; cilia of the inner peristome present and appendiculate — Central Ohio: very rare — Lower leaves with a reddish tint. (Eu.)

## 49. MNÌUM, Br. & Sch. (Tab. 17.)

Calyptra small, cuculliform, fugacious. Operculum convex at the base, apiculate or rostellate. Capsule oval or oblong, not pyriform, mostly pendulous, long-pedicellate, annulate. Peristome as in Bryum. Inflorescence dicœcious or hermaphrodite: male flower with clavate paraphyses. — Nearly allied to the preceding genus, its species however larger and more showy, conspicuous for their broad, smooth, glossy leaves, with a spinulose-serrated thickened border, a percurrent costa, and large roundish-hexagonal areolæ; stems innovating from near their base, stoloniferous; growing on the ground or on rocks in shady situations. (Μνίον, an ancient name for Moss.)

* *Inflorescence dicœcious: male flower terminal, discoid.*

1. **M. affìne,** Bland. Stems radiculose, 1′–3′ high; upper leaves large, elliptic-oblong or ligulate-obovate, crowded, spreading, undulated or crisped when dry, their thickened border simply spinulose-serrate; leaves of the procumbent or arched shoots roundish, 2-ranked; capsule oblong, large; operculum apiculate; pedicels often 2–4 from the same perichæth. — On the ground, shaded banks in woods: frequent. (Eu.)

2. **M. hórnum,** Hedw. Stems and barren shoots erect, 1′–3′ high; leaves erect-patent, narrowly lanceolate, their thickened border doubly spinulose-serrate; capsule oblong, tapering into the pedicel, horizontal; operculum apiculate. — White Mountains of New Hampshire, *Oakes.* (Eu.)

3. **M. orthorhýnchum,** Brid. Stems simple, 1′–1½′ high; upper leaves ovate-lanceolate, subspatulate, the border as in the last species; areolæ unusually small and opaque for the genus; capsule horizontal, oblong, slightly incurved; operculum conic-rostellate. — Wet pine-woods, near Montreal, Canada East. (Eu.)

4. **M. stellàre,** Hedw. Stems closely cæspitose, 1′–2′ high; leaves oval-oblong, inclining to spatulate, without a thickened border, strongly serrate above, very brittle when dry; areolæ roundish, rather small; capsule oblong, horizontal, slightly incurved; operculum simply hemispherical. — Margins of woodland brooks: fruit rare. — Foliage dark green with an indigo tinge, and acid to the taste. (Eu.)

5. **M. punctàtum,** Hedw. Stems ½′–4′ high, radiculose; leaves large, spreading, roundish-obovate, narrowed at the base, scarcely pointed, with a thickened firm border, not serrate; capsule rather pendulous, oval; operculum conic-rostellate. — Wet places, on the ground, Alleghany Mountains. — Foliage with a reddish tinge. (Eu.)

* * *Inflorescence hermaphrodite.*

6. **M. serràtum,** Brid. Stems ½′–1′ high, loosely cæspitose; leaves ovate-lanceolate, the thickened border doubly spinulose-dentate; capsule nearly horizontal, oval, gradually tapering into the pedicel; operculum short-rostellate. — Margins of rivulets, in woods. — Among the smallest species. (Eu.)

7. **M. Drummóndii,** Br. & Sch. Densely cæspitose; stems about 1′ high; leaves erect from an oblong narrow base, broad-ovate, shortly acuminate, scarcely crisped when dry, with a narrow, thickened, and simply spinulose-den-

tate border; capsule short, oval, pendulous; operculum short, conic-acute.— White Mountains, New Hampshire, *Oakes*.

8. **M. rostràtum,** Schwægr. Stems ½′–1′ high; the sterile branches longer, decumbent or somewhat creeping; leaves oval-oblong, obtuse, very short-apiculate, the thickened border obtusely dentate; operculum rostrate, half as long as the capsule; pedicels often 2–5 together.— Along woodland rivulets. (Eu.)

9. **M. cuspidàtum,** Hedw. Stems ½′–1′ high, closely tufted, radiculose, the sterile branches arcuate or decumbent; lower leaves obovate-acuminate, the upper oval-acuminate with a narrowed base, the thickened border simply serrate; capsule somewhat pendulous, solitary; operculum convex, scarcely apiculate.— Woods, about the roots of trees: frequent. (Tab. 17.) (Eu.)

## Tribe XX. MEESIÈÆ.

### 50. MEÉSIA, Hedw. (Tab. 17.)

Calyptra small, cuculliform, fugacious. Operculum conic. Capsule apophysated, erect-cernuous, clavate, with a small oblique mouth, very long-pedicellate, narrowly annulate. Peristome double; the exterior of 16 short obtuse teeth, with a medial line; the interior of 16 carinate cilia, much longer than the teeth, with a narrow basal membrane. Inflorescence various: male flower with clavate paraphyses.— Tall and striking species, inhabiting bogs and swamps, remarkable for their slender stems and long pedicels, in habit Bryoid, in shape of capsule allied to the Funarieæ; leaves of a lanceolate outline, with a semi-amplexicaul and decurrent base; the costa percurrent; areolæ small, compact, oblong.— (Named for *D. Meese*, a Dutch botanist.)

1. **M. longisèta,** Hedw. Hermaphrodite; stems 3′–5′ high, tomentose; leaves ovate-lanceolate, spreading, plane and entire on the margins, serrate, twisted when dry; capsule clavate-pyriform, incurved, the apophysis constituting half its length (as in the other species); the exterior peristome more or less adherent to the interior; annulus rather persistent; operculum obtuse; pedicels 4′–5′ long.— Cranberry marshes, Northern Ohio.— A variety, smaller in all its parts, occurs among the mountains of New England. (Tab. 17.) (Eu.)

2. **M. tristicha,** Br. & Sch. Distinguished from the preceding by its 3-ranked, wider, squarrose and denticulate leaves, and the dicœcious inflorescence, with a terminal discoid male flower.— Grows in similar places. (Eu.)

3. **M. uliginòsa,** Hedw. Smaller than No. 1 and 2, monœcious and hermaphrodite on the same plant; leaves linear-lanceolate or linear, obtuse, with entire recurved margins and a heavy costa; operculum truncate.— White Mountains, New Hampshire, *Oakes:* St. Paul, Minnesota, *Lesquereux*. (Eu.)

## Tribe XXI. BARTRAMIÈÆ.

### 51. BARTRÁMIA, Hedw. (Tab. 17.)

Calyptra small, dimidiate, fugacious. Operculum small, conic-convex. Capsule globular, cernuous, seldom erect or pendulous, exannulate, striated,

when dry furrowed, with a long and erect (rarely short and arcuate) pedicel. Peristome usually double, sometimes single or none; the exterior of 16 teeth like those of Bryum; the interior a plicated membrane divided half-way into 16 cilia, splitting along their middle; their segments divergent; rudimentary ciliolæ often present. Inflorescence various. — Plants remarkable for their globose capsule; growing in extensive tufts on the ground, and on rocks, rarely on trees; stems covered with a dense radicular tomentum; leaves lanceolate, more or less elongated, serrate, papillose on both surfaces, of a firm texture; areolæ dense, quadrate or oblong; costa percurrent or excurrent. (Named in honor of *John Bartram*, the earliest native American botanist.) — In the following species the capsule is cernuous: peristome double: pedicel long and erect.

§ 1. BARTRAMIA PROPER. — *Stems dichotomously branched.*

1. **B. ithyphýlla,** Brid. Hermaphrodite; tufts compact, bright yellowish-green; stems $\frac{1}{2}'-2'$ high; leaves erect-patent, lanceolate, subulate from a broad, sheathing, whitish base; costa large, excurrent, with a scabrous point — Alpine and subalpine rocks, White Mountains, New Hampshire. (Eu.)

2. **B. Œderi,** Swartz. Hermaphrodite; tufts loose, extensive, dark-green; stems slender, $1'-3'$ high; leaves remote, patent-recurved from an erect (not sheathing) base, lanceolate, carinate, scarcely papillose, recurved on the margins, costate to the apex. — Mountains of New England. (Eu.)

3. **B. pomiformis,** Hedw. Monœcious; tufts large, rather dense, glaucous-green; stems $1'-3'$ high; leaves crowded, spreading, lanceolate-subulate or linear-subulate, crisped when dry, flattish, the costa excurrent; male flower gemmiform, contiguous to the female. — Shady banks, either dry or moist: common. (Tab. 17.) (Eu.)

§ 2. PHILONÒTIS, Brid. — *Stems fasciculately branched.*

4. **B. fontàna,** Brid. Dicœcious; tufts extensive, dense, yellowish or glaucous-green; stems elongated ($3'-7'$ high); branches interruptedly verticillate; leaves of two forms, either short, ovate-acuminate and appressed, or longer, lanceolate and spreading or secund, both reflexed on the margins below and obscurely plicate at the base; inner leaves of the discoid male flower obtuse, not costate. — Wet springy places, in mountain districts. (Eu.)

5. **B. calcàrea,** Br. & Sch. Dicœcious; compared with the last species (which it very closely resembles), its leaves are longer, more rigid and gradually tapering, less papillose, with a larger areolation and a stronger costa; perigonial leaves costate to the acuminated apex; teeth of the peristome not so closely articulated. — Specimens intermediate between this species (as above described from European specimens) and No. 4, were gathered by *Lesquereux*, on wet rocks, in the mountains of North Carolina. (Eu.)

6. **B. Márchica,** Brid. Dicœcious; resembles reduced forms of B. fontana; leaves uniform in shape, spreading or secund, narrow, lanceolate, not plicate, mucronate by the excurrent costa; capsule thin-walled; male flower gemmiform; perigonial leaves erect, lanceolate, acute, costate. — (B. Muhlenbergii, *Schwœgr.*) — Gravelly and springy places. (Eu.)

7. **B. radicàlis,** Beauv. Monœcious; stems short; leaves linear-lanceolate, erect, cuspidate by the long-excurrent scabrous costa; male flower gemmiform, close to the female. — Wet clay-banks, Ohio and southward.

### 52. CONÓSTOMUM, Swartz. (Tab. 17.)

Calyptra cuculliform. Operculum conic-rostellate. Capsule globular, cernuous, exannulate, with a long erect pedicel. Peristome single: teeth 16, linear-lanceolate, prominently articulated, with a medial line, united at their apices. Inflorescence dœcious: male flower subdiscoid, with clavate paraphyses. — A genus scarcely distinguishable from Bartramia, differing only in the structure of the peristome, the rostellate operculum, and the larger and less fugacious calyptra. (Name from *κῶνος, a cone,* and *στόμα, a mouth,* in allusion to the cone-like appearance of the peristome.)

1. **C. boreàle,** Swartz. Stems compactly cæspitose, ½′–2′ high, glaucous-green above, brownish below; leaves erect, imbricated in 5 rows, lanceolate-acuminate, serrate, sharply carinate, mucronate by the excurrent costa. — On rocks, in bleak alpine situations, White Mountains of New Hampshire. (Tab. 17.) (Eu.)

## Tribe XXII. FUNARIÈÆ.

### 53. FUNÀRIA, Schreb. (Tab. 17.)

Calyptra cuculliform, inflated below, subulate above. Operculum conic or convex-obtuse. Capsule obliquely pyriform, rather ventricose, cernuous, with a small oblique mouth, long-pedicellate. Peristome double: the exterior of 16 teeth, oblique, lanceolate-attenuated, and connected at their apices by a small reticulated disk; the interior a membrane divided to the base into 16 lanceolate cilia, opposite the teeth. Inflorescence monœcious: male flower subdiscoid, its paraphyses much enlarged at their apex. — Annual or biennial gregarious plants, growing on the ground; stems at first simple, terminated by a male flower, afterwards branched, the branches producing fertile flowers; lower leaves remote; upper ones clustered, larger, broad-lanceolate, of a thin and loose texture; the areolæ large, hexagonal-oblong; costa loosely cellular, ceasing below the apex. (Name from *funis,* a rope, from the twisted pedicel.)

1. **F. hygrométrica,** Hedw. Stems 3″–10″ high; upper and perichætial leaves connivent, crowded into a bud-like cluster, broadly ovate-lanceolate, very concave, entire, costate nearly to the apex; the perigonial leaves serrate; capsule furrowed when dry, the border of its mouth corrugated; annulus large, spirally unrolling; pedicel (2′–3′ long) arcuate and flexuous. — Var. CALVÉSCENS has the pedicel more elongated and straight, the capsule more slender, and almost erect. — Very common, on the ground (particularly when lately burnt over), and on walls; the variety occurs mostly in the Southern States. (Tab. 17.) (Eu.)

2. **F. flávicans,** Michx. In general appearance very much like the last, but the color paler; leaves not so connivent and with a long cuspidate point, the

costa excurrent; pedicels not arcuate nor so flexuous; capsule less obovate, very slightly furrowed when dry; mouth larger, not so oblique, and its border smooth. — Southern States.

3. **F. Muhlenbérgii,** Schwægr. Very much smaller than No. 1 or 2; stems 1″–3″ high; upper leaves erect-patent, oblong-obovate, suddenly acuminate, obtusely serrate, the costa ceasing below the point; capsule shortly pyriform, not furrowed when dry; operculum convex, apiculate; annulus none; pedicels 6″–8″ high, twisted to the right when dry; spores more than twice the diameter of those of No. 1, granular on the surface. — Pennsylvania. (Eu.)

4. **F. serràta,** Beauv. Intermediate in size between Nos. 1 and 3; compared with the last, the leaves are longer, spatulate-lanceolate, distantly and sharply serrated above, the costa excurrent; operculum convex, not apiculate; the pedicel 1′–1½′ high, when dry twisted to the left its whole length; spores larger. — Pennsylvania and southward.

## 54. ENTÓSTHODON, Schwægr. (Tab. 18.)

Calyptra rostrate, cuculliform, inflated below. Operculum depressed-convex. Capsule erect, pyriform, symmetrical, smooth, long-pedicellate. Peristome single: teeth 16, short, somewhat fissile, linear-lanceolate, inserted below the orifice of the capsule, horizontal. — Inflorescence, ramification, and structure of leaves as in Funaria. — (Name formed of *ἔντοσθεν, from within,* and *ὀδών, tooth,* alluding to the insertion of the teeth.)

1. **E. Drummóndii,** Sulliv. Stems 1″–2″ high; leaves connivent, elliptic-oblong, rather obtuse, slightly crenate on the margin, concave, costate to the apex, areolation large; capsule globose-pyriform, operculum flattish; pedicels 5″–7″ high; calyptra erect, with a straight subulate rostrum as long as the capsule. — (E. obtusifolius, *Hook. & Wils. in Drum. 2d coll.* No. 36.) — Wet, clayey soil, Southern States. — The short-pyriform capsule and the long-subulate rostrum of the calyptra, readily distinguish this species from the nearly allied E. Templetoni, *Schwægr.* and E. obtusifolius, *J. D. Hook.* (Tab. 18.)

## 55. PHYSCOMÍTRIUM, Brid. (Tab. 18.)

Calyptra long-rostrate, mitriform and lobed at the base, or inflated-cuculliform. Operculum flattish-convex, with or without an apiculus. Capsule pyriform, symmetrical, exannulate, its pedicel mostly erect. Peristome wanting. — Annual and biennial plants, with the inflorescence, ramification, and structure of leaves as in Funaria. (Name from *φύσκος, something inflated,* and *μιτρίον, a little cap.*)

1. **P. pyrifórme,** Br. & Sch. Stems 2″–5″ high; leaves spatulate-lanceolate, serrate, spreading, the costa nearly percurrent, capsule globose-pyriform, on an erect exserted pedicel 5″–8″ long; calyptra mitriform, lobed. — On the ground; extremely common. (Eu.)

2. **P. immérsum,** Sulliv. Leaves obovate-lanceolate, serrate, the costa percurrent; capsule immersed, hemispherical without the operculum, which is

short-pointed from a convex base, and deciduous with the columella attached; calyptra small, mitriform, 4–5-lobed at the base. — (P. sphæricum, *Musc. Alleghan.*, No. 196.) — Banks of the Ohio River subject to inundation. — A minute annual: length of the whole plant 2″–3″. (Tab. 18.)

3. **P. tetrágonum,** Br. & Sch. Stems gregarious, scarcely 1″ high; leaves connivent, ovate-lanceolate, acuminate, the costa ceasing at the apex or excurrent; capsule globose-pyriform, on an erect pedicel (1″ high), wide-mouthed when dry; operculum convex, apiculate; calyptra very large, twice as long as the capsule, fusiform, 4-sided, splitting on one side. — On the ground, San Marcos, Texas, *Wright:* Vincennes, Indiana, *Lesquereux.* (Ed.)

### 56. APHANORHÉGMA, Sulliv. (Tab. 18.)

Calyptra small, campanulate-mitriform, lobed at the base. Operculum hemispherical, apiculate. Capsule immersed (including the operculum), spherical, nearly sessile, exannulate. Peristome none. Inflorescence monœcious or hermaphrodite: paraphyses globosely distended at the apex. — A genus, by its feeble dehiscence, globose capsule, and the characters of vegetation, forming an intermediate link between Physcomitrella among Cleistocarpous, and Physcomitrium among Stegocarpous Mosses. (Name from *ἀφανής, unapparent,* and *ῥῆγμα, rupture,* or *suture;* i. e. dehiscence obscure.)

1. **A. serràta,** Sulliv. Stems 2″–3″ high, simple or innovating from below the apex; leaves oblong-lanceolate, serrate, costate nearly to the point of a large and loose hexagonal areolation; capsule (when mature) separating under pressure along an indistinct transverse suture (not visible at an early stage) into two equal portions; antheridia (occasionally intermixed with a few archegonia) in the axils of the perichætial leaves, usually naked, sometimes with 1 or 2 small perigonial leaves. — (*Sulliv. in Mem. Amer. Acad.*, n. scr. 4, p 60, t. 2.) — Damp soil, New England to Ohio. — Strikingly like Physcomitrella patens; distinguished mainly by its feeble operculation, and the denser texture of the outer wall of the capsule. (Tab. 18.)

## Tribe XXIII. SPLACHNÈÆ.

### 57. SPLÁCHNUM, L., Br. & Sch. Umbrella-Moss. (Tab. 18.)

Calyptra small, conic, entire or uneven at the base: operculum convex or mammillate. Capsule erect, obovate-oblong or subcylindrical, with a very large spongy and differently colored obovate, globose or umbraculiform apophysis, long-pedicellate. Peristome single, of 16 double teeth in pairs, reflexed when dry. Columella emergent, capitate. Inflorescence mostly dicœcious: male flower capituliform, terminal. — Plants of a peculiar structure, readily recognized by the exceedingly large apophysis of the capsule; perennial, cæspitose, growing only on the dung of herbivorous animals; stems innovating from below the floral apex, dichotomous, of a succulent soft texture; leaves lanceolate, taper-pointed, thin and delicate, with large loose, oblong, hexagonal areolæ; costa slight, ceasing below the point. (*Σπλάγχνον,* a name used by Dioscorides for some cryptogamous plant.)

1. **S. ampullàceum,** L. Stems ½′–2′ long; leaves oblong- or obovate-lanceolate, acuminate, entire or irregularly dentate; apophysis violet-purple, obovate, tapering into the purplish pedicel, and twice or thrice the width of the yellow capsule. — New England to Pennsylvania: rare. (Tab. 18.) (Eu.)

2. **S. rùbrum,** L. Stems short (3″–6″); leaves spatulate-obovate, long-pointed, serrate, somewhat complicate and undulate on the margins; apophysis deep red, very large, umbrella-shaped, 7–10 times as wide as the minute capsule; pedicels 4′–5′ long. — Maine, *A. Young.* (Eu.)

## 58. TETRAPLODON, Br. & Sch. (Tab. 18.)

Calyptra small, conic, entire, or split on one side and somewhat cuculliform. Operculum conical-convex, obtuse. Capsule erect, small, oval-oblong, with a solid clavate apophysis tapering into an exserted pedicel. Peristome single, of 16 double teeth, at first in fours, afterwards in pairs, reflexed when dry. Columella not emergent. Inflorescence monœcious: male flower gemmiform or capitulæform, axillary or terminal. — A genus scarcely separable from the last; besides the above characters, the stems are more compactly cæspitose; the apophysis does not increase in size after the maturity of the capsule, and the color and consistence of the two is uniform; the cellular tissue of the leaves not so lax; and the habitat is on animal substances, or on the dung of carnivorous animals. — (Name from τετραπλόος, *fourfold,* and ὀδών, *tooth;* the teeth of the peristome being at first in fours.)

1. **T. angustàtus,** Br. & Sch. Stems ½′–3 long, radiculose; leaves erect-patent, remote, oblong-lanceolate, produced into a long flexuous point, obsoletely or distinctly dentate; apophysis oblong-obconic, somewhat wider than the capsule; calyptra whitish, conic, cuculliform, descending to the top of the apophysis. — White Mountains of New Hampshire, *B. D. Greene, Oakes:* Lake Superior, *Loring.* — A northern species. (Eu.)

2. **T. austràlis,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 151.) Resembling very closely the last species; leaves often with 3–5 large tooth-like lobes on each side, sometimes almost pinnatifid, rarely simply dentate or nearly entire; apophysis much longer and more tapering; teeth of the peristome less deeply inserted within the capsule's mouth, the rim of which has angular-rotund (not transversely oblong) cellules; calyptra yellowish, elongated-conic, (not split on one side,) descending scarcely to the base of the hemispherical apiculate operculum. — (Splachnum setaceum, *Hook. & Wils. in Drum. 2d coll. No.* 27; — not of *Michx.,* whose plant was from Canada, and most probably belongs to the preceding species.) — Swamps, near the sea-coast, New Jersey to Florida. — It is doubtful whether this species belongs to the present, or to the last genus. (Tab. 18.)

3. **T. mnioìdes,** Br. & Sch. Stems ½′–2′ high; leaves erect-patent, rather close, elliptic-oblong or obovate, concave, suddenly attenuated into a long flexuous point; capsule and its clavate apophysis of about the same width, both dark red. — Catskill Mountains, New York, *Olney.* (Eu.)

## Div. II. Pleurocárpi.

Fruit lateral on the stem or branches. (Peristome mostly double.)

### Tribe XXIV. FONTINÀLEÆ.

**59. FONTINÀLIS,** Dill. Fountain-Moss. (Tab. 18.)

Calyptra small, conic, crenate or somewhat lacerate at the base. Operculum conic. Capsule ovate, oval, or cylindrical, subsessile. Peristome double; the exterior 16 linear-lanceolate teeth cohering at their apices in pairs; the interior 16 cilia connected by cross-bars, forming a more or less complete tessellated cone. Inflorescence dioecious. — Large Mosses, floating in water, and rooting at their base only; leaves 3-ranked, ecostate, with a minute linear areolation; capsule immersed in the perichætial leaves, and terminal on short, lateral, supra-axillary branches. (Name from *fontinalis*, a fountain, in allusion to its place of growth.)

1. **F. antipyrética,** L. Stems 8′–12′ long, very much divided, flexile; leaves broadly ovate-acuminate, complicate-carinate, the margin on one side reflexed; perichætial leaves oblong, obtuse, eroded at the apex, closely embracing the oval capsule; inner peristome a complete tessellated cone. — Mountain rivulets, New England. — Variable in size and color. (Tab. 18.) (Eu.)

2. **F. squamòsa,** L.? Smaller than No. 1; ramification more fasciculate; leaves concave, not complicate-carinate. — Mountain streams, Southern States: without fruit. — Perhaps a different species. (Eu.)

3. **F. bifórmis,** Sulliv. Leaves of two forms, those appearing in the spring large, broad, ovate-lanceolate, concave, flaccid, disappearing in the summer, and succeeded by others much smaller, narrowly linear-lanceolate, convolute, and clothing new branches; both kinds denticulate at the apex, their basal angles auriculate, and composed of large oblong pellucid cellules; capsule oval or oblong-cylindrical; perichætial leaves as in No 1; operculum more elongated; teeth of the exterior peristome with 18–20 articulations; cilia of the interior peristome connected at their tips only by a few cross-bars, elsewhere appendiculate. (F. disticha, var. *Musc. Alleghan., No.* 191, and Pilotrichum sphagnifolium, *Mull. Synop.* 2. *p.* 150, are the spring state of the plant; F. disticha, var *Musc. Alleghan., No.* 192, and Pilotrichum distichum, *Mull. l. c.*, are the summer state.) — Woodland rivulets, near Columbus, Ohio: New Haven, Conn., *D. E. Eaton.* — Fruit rare: male flowers terminal on short club-shaped branches

4. **F. dísticha,** Hook. & Wils. (in Drum. S. Mosses, No. 151.) A stiff, elastic species, much more slender than any of the preceding; stems reddish; branches short and widely spreading; leaves erect-patent or rather appressed, linear-lanceolate, convolute, attenuated, dentate at the extreme point; capsule cylindrical, its length 5 times its diameter; operculum narrowly conic, one third as long as the capsule; teeth of the peristome more or less cleft along the medial line between the 12–15 articulations; cilia granulated and connected as in No. 3. — Rivulets near Mobile, Alabama.

5. **F. Lescùrii,** Sulliv. (Musc. Bor.-Amer., No. 228.) Near the last, but a soft, flaccid, and somewhat larger species; leaves broader, shorter, not

so attenuated, nor the areolation so linear; capsule cylindrical, its length only 2½ times its diameter, and with a perichætial branch much longer; teeth of the peristome not cleft along the centre, articulations 20–25; cilia not so granulated, more connected from their apices downwards by cross-bars: antheridia 3–5, large, projecting beyond the perigonial leaves, with long paraphyses. — Falls of Little River, Lookout Mountains, Alabama, *Lesquereux.* — Fruit rare.

6. **F. Dalecárlica,** Bryol. Europ. Slender and much divided; branches numerous, elongated, somewhat julaceous; leaves narrowly-lanceolate, convolute; perichætial leaves acute, the 3 inner ones recurved at the apex and longer than the ovate capsule; operculum short; teeth of the peristome perforated between the 10–12 articulations; cilia as in No. 3, but not granulated. — (F. squamosa, *Drum. Musc. Amer., No.* 233; *Musc. Alleghan., No.* 188.) — White Mountains, *Oakes, James;* Fulton County, New York, *D. C. Eaton.* (Eu.)

**60. DICHELÝMA,** Myrin. Brook-Moss. (Tab. 18.)

Calyptra dimidiate or cuculliform, entire at the base. Operculum conic-rostrate. Capsule oval or oblong, pedicellate. Peristome double; the exterior 16 linear teeth perforated along the medial line; the interior 16 cilia longer than the teeth, and more or less connected by cross-bars. Inflorescence diœcious. — Stems slender, floating in water, sparingly divided and branched; leaves 3-ranked, much elongated, with a percurrent costa, those of the perichæth very conspicuous and ecostate. (Name from διχάω, *to divide,* and ἔλυμα, *a veil,* in allusion to the cleft or cuculliform calyptra.)

1. **D. falcàtum,** Myrin. Leaves lanceolate-subulate, complicate-carinate, falcate-secund; the inner perichætial leaves very much elongated, closely wrapped around the lower half of the long pedicel; capsule oval-oblong; inner peristome a tessellated truncated cone; calyptra dimidiate, elongated, clasping the pedicel. — Head-waters of the Saco River, White Mountains, New Hampshire, *James:* Brattleborough, Vermont, *C. C. Frost.* (Eu.)

2. **D. capillàceum,** Bryol. Europ. Branches few, widely spreading; leaves dark or yellowish-green, subulate from a narrow lanceolate base by the long-excurrent costa, secund-falcate, denticulate at the apex; those of the perichæth convolute, overtopping the oval capsule which emerges laterally; calyptra dimidiate, extending below the capsule, and spirally convolute; cilia of the inner peristome connected at their apices only. — Rivulets, Pennsylvania and northward. (Tab. 18.) (Eu.)

3. **D. pallèscens,** Bryol. Europ. Much like No. 2, but smaller; leaves pale green, shorter, wider, more complicate-carinate, and more falcate, with a larger areolation; cilia of the inner peristome not connected by cross-bars. — (D. capillacea, *Drum. Musc. Amer., No.* 234.) — British America, *Drummond.*

4. **D. subulàtum,** Myrin. Stems elongated, subpinnate; branches short, widely spreading; leaves erect-patent, lanceolate, complicate-carinate, the costa ceasing at the denticulate apex; capsule ovate-oval, short-pedicelled, concealed by the broad and straight perichætial leaves; calyptra cuculliform, not descending below the convex-rostellate operculum; cilia of the inner peristome free, except at their apices. — Louisiana, *Drummond.*

## Tribe XXV. CRYPHÆÈÆ.

### 61. CRYPHÆA, Mohr. (Tab. 19.)

Calyptra conic-mitriform, papillose at the apex, small. Operculum conic. Capsule immersed, ovate-oblong, short-pedicellate, annulate. Peristome double; the exterior 16 lanceolate-subulate teeth remotely articulated, granulated; the interior 16 subulate cilia, the basilar membrane nearly obsolete. Inflorescence monœcious: antheridia oval, with long pedicels and short paraphyses. — Rather slender Mosses, growing on trees, with leafless creeping stems and ascending or pendulous and subsimple densely leafy branches, bearing in lines or clusters numerous perichætia enveloping the capsule. (Name from *κρυφαῖος, hidden,* in allusion to the concealed capsule.)

1. **C. glomeràta,** W. P. Sch. The ascending branches nearly simple, 1′ long; leaves crowded, when dry appressed, when moist recurved-spreading, ovate-acuminate, minutely-serrulate at the apex, semi-costate, with a minute oval areolation; annulus broad; perichætial leaves obovate-oblong, suddenly cuspidate. — (Daltonia heteromalla, var. *Hook. & Wils. in Drum. Musc. 2d coll. No.* 99.) — Southern States: common. — Larger than the European C. heteromalla, *Brid.*, with more crowded spreading leaves, much shorter peristome, and larger spores. (Tab. 19.)

2. **C. nervòsa,** Hook & Wils. Has the aspect of No. 1; leaves when dry erect, not appressed, with recurved margins; costa extending to the point; calyptra split on one side; annulus narrow; perichætial leaves longer-lanceolate and papillose on the back. — Grows with the last.

3. **C. inundàta,** Nees. (in Neuvied Trav.) Stems pendulous, loosely pinnately-branched; branchlets recurved at the apex; leaves distant, oblong-lanceolate, carinate, the lower ones complicate, oblique; costa heavy, excurrent, capsules oval, unilateral on the stems, immersed in the long ecostate perichætial leaves; cilia of the interior peristome red, persistent, incurved at the apex, as long as the teeth. — Floating in water, and attached to the immersed branches of trees, Wabash, Fox, and Black Rivers, Illinois. — Scarcely a Cryphæa: very probably Dichelyma subulatum, or a closely allied species.

## Tribe XXVI. LEUCODÓNTEÆ.

### 62. LEÙCODON, Schwægr. (Tab. 18.)

Calyptra dimidiate, large, clasping the pedicel. Operculum conic-rostrate. Capsule broadly oval, its pedicel enclosed by the long sheathing perichæth. Peristome double; the exterior 16 linear-acuminate, whitish, granulated teeth more or less perforated along the medial line; the interior (when present) a simple annular membrane extending ½ the length of the teeth. Inflorescence dicœcious. — Species of moderate size, with a filiform and leafless creeping primary stem, and numerous terete nearly simple branches, densely clothed with ovate-acuminate ecostate leaves. (Name composed of *λευκός, white,* and *ὀδών, tooth,* from the color of the outer peristome.)

1. **L. julàceus,** Sulliv. Branches 8″–10″ high; leaves appressed, when dry recurved, horizontal when moist, ecostate, revolute on the margins: areolation minute, oval-rotund; perichætial leaves as long as the pedicel. — Trees, Middle States, in districts not mountainous. (Tab. 18.)

2. **L. brachypus,** Brid. Very like the preceding; branches more elongated (1½′–2′ long), recurved; leaves longer, when dry secund; operculum longer-rostrate; pedicel shorter; perichætial leaves overtopping the capsule. — Alleghany Mountains.

## 63. LÉPTODON, Mohr. (Tab. 18.)

Calyptra dimidiate, large, hairy. Operculum conic-rostellate. Capsule ovate-oblong, its pedicel concealed by the large perichæth. Peristome double; the exterior 16 linear acuminate whitish teeth, more or less fissile along the medial line; the interior a membrane lining and bordering the teeth. Inflorescence diœcious. — Rather stiff Mosses, with prostrate filiform naked stems, and crowded mostly simple and pinnated branches, densely clothed with oblong-ovate leaves, having a dot-like areolation. (Name composed of λεπτός, *narrow*, and ὀδών, *a tooth*.)

1. **L. trichomítrion,** Mohr. Main branches 1½′–2′ long; leaves when moist erect-patent, ecostate, reflexed on the margins; the perichætial leaves long as the pedicel. — In woods; forming elastic masses on the trunks of trees, sometimes on rocks; Northern and Middle States.

2. **L. immérsum,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 234.) Somewhat smaller than the preceding; leaves not so crowded, more suddenly acuminate; capsule urceolate-oblong, its mouth larger; articulations of the teeth of the peristome closer; perichætial leaves concealing (besides the pedicel) the larger portion of the capsule. — Trees, Southern States.

3. **L. Ohioénse,** Sulliv. Much like No. 1; but stems more slender and elongated, less regularly pinnate; leaves when moist spreading horizontally, the costa extending to the middle. — Trees, Central Ohio. (Tab. 18.)

## 64. ANTITRÍCHIA, Brid. (Tab. 18.)

Calyptra cuculliform. Operculum conic. Capsule oval, exannulate, with a flexuose-arcuate pedicel. Peristome double; the exterior 16 lanceolate-subulate teeth; the interior 16 subulate fugacious cilia. Spores large. Inflorescence diœcious. — A large Moss with distantly subpinnate and flexuous ascending or pendulous stems, and crowded broadly ovate-acuminate semi-costate leaves; the perichætial elongated and sheathing. (Name from ἀντί, *opposite*, and τρίχιον *a little hair*, the cilia erroneously supposed to be opposite the teeth.)

1. **A. curtipéndula,** Brid. Leaves ciliate-serrate at the apex, recurved on the margins, plicate with 4–5 short costæ at the base, the central one extending beyond the middle; cellules minute, those at the basal angles oval, disposed in oblique lines, elsewhere oblong. — Summit of Black Mountain, North Carolina, *Lesquereux*. (Tab. 18.) (Eu.)

## Tribe XXVII. LÉSKEÆ.

### 65. ANÓMODON, Hook & Tayl. (Tab. 19.)

Calyptra cucullate. Operculum conic-rostrate. Capsule cylindrical, erect, long-pedicellate. Peristome double; the exterior 16 subulate-lanceolate teeth; the interior 16 cilia shorter than the teeth, and connected at base by a narrow membrane. Inflorescence dœcious. — Stems prostrate, stoloniferous, microphyllous: the branches ascending, simple, 2–3 divided or fasciculately ramulose, with elongated, costate, opaque, granulated leaves; their areolation minute and dot-like. (Name, *ἄνομος, irregular*, and *ὀδών, tooth*, from a supposed abnormal construction of the peristome.)

1. **A. viticulòsus,** Hook. & Tayl. Branches 2′–2½′ high, often geniculate; leaves secund, larger as they ascend, linear-lanceolate from an oblong-ovate base, obtuse, of a thick compact structure, minutely papillose on both surfaces; costa pellucid, ceasing near the apex; annulus double, persistent. — Shaded rocks, Niagara Falls; without fruit. (Eu.)

2. **A. apiculàtus,** Br. & Sch. Very near the preceding, rather smaller; leaves linear-oblong from a cordate-ovate base, apiculate; cellules with longer papillæ, those of the basal margins slightly ciliate; costa shorter, often forked. — On old logs, Alleghany Mountains.

3. **A. obtusifòlius,** Br. & Sch. Branches compressed, shorter than in No. 1, less divided; leaves 2-ranked, of a more uniform width throughout, linear-oblong, very obtuse, the costa shorter; capsule elliptical; inner peristome wanting or rudimentary; annulus large. — Trunks of trees, near watercourses, in low grounds. (Tab. 19.)

4. **A. attenuàtus,** Hub. Branches 1′–2′ long, fasciculately ramulose; the ramuli incurved, attenuate; leaves ovate-lanceolate, somewhat obtuse, subsecund; annulus none; peristome well developed, the cilia nearly as long as the teeth, and with 1–2 interposed ciliolæ. — On rocks and roots of trees, near streams; common. (Eu.)

5. **A. longifòlius,** Hartm. Distinguished from the last by its more attenuated branches, straighter and longer acuminate leaves, smaller capsule, shorter pedicel, and much less complete peristome. — Habitat similar: said to be North American by Schimper. (Eu.)

6. **A.? Toccòæ,** Sulliv. & Lesqx. (Muse. Bor.-Amer.) Branches 1′–2′ long, rather stout, simple or sparingly divided, when dry circinate; leaves lanceolate from an oblong base, reflexed on the lower margins, concave below, concave-carinate above, very strongly and irregularly serrate at the point; cellules very minute, quadrate-rotund, protuberant (not papillose), arranged in lines; costa nearly percurrent and flexuous at its upper end. — Toccoa Falls, Georgia, *Lesquereux:* with perichætia only. — In the Herbarium of the late Dr. Taylor are specimens marked "Neckera Nepalensis, *T. T. mss.*, Nepal," apparently the same as those from Toccoa Falls, with imperfect fruit like that of No. 4.

7. **A.? trìstis,** Cesati. Much smaller than any of the foregoing; branches filiform, rigid, sparingly divided; leaves brittle, usually broken, when moist

squarrose, somewhat ligulate-acuminate from a broad suberect amplexicaul base, crenulate on the margins by the large protuberent cellules; costa indistinct, seldom extending half-way. — Leskea fragilis, *Hook. & Wils. in Drum. Mosses, 2d coll. No.* 101. — Hypnum triste, *Mull. Synop. Musc.* 2. *p.* 478.) — Very common throughout the United States; on trees, particularly the Hornbeam. Fruit unknown. (Eu.)

### 66. LÉSKEA, Hedw.; Bryol. Europ. (Tab. 19.)

Calyptra cuculliform. Operculum conic, acuminate or rostrate. Capsule oval or cylindrical, pedicellate. Peristome double; the exterior 16 lanceolate-subulate teeth; the interior 16 narrow cilia, as long as the teeth, arising from a carinate membrane. Annulus persistent. Inflorescence monœcious or diœcious. Stems prostrate, irregularly or subpinnately branched; leaves of the stem and branches uniform, ovate-lanceolate, more or less acuminate, mostly costate, smooth or papillose, with close subrotund or oval areolation. (Named for *N. G Leske*, an early German botanist.)

1. **L. polycárpa,** Hedw. Monœcious; stem 2′ long or more, irregularly branched; branches ascending, ½′–1′ high; leaves ovate-lanceolate, patent or secund, recurved on the margins below, strongly costate to near the apex; capsule cylindrical, slightly curved; operculum conic, acute; perichætial leaves striate. — Roots of trees, in wet places. (Eu.)

2 **L. obscùra,** Hedw. Monœcious; smaller than No. 1; ramification the same; leaves ovate or oblong-ovate, rather obtuse, opaque, the margins below recurved; costa reaching to the apex; capsule erect, oblong-elliptical; operculum short, conic; cilia of the inner peristome perforated. — On trees, within reach of floods: fruits copiously. (Tab. 19.)

3. **L. microcárpa,** W. P. Sch. in litt. Monœcious; stems subpinnately branched; leaves ovate or oval, concave, long and slenderly acuminate, spreading, rather lax; costa reaching nearly to the point; capsule oval-oblong. — (L. nervosa, *Musc. Alleghan*, No. 69.) On roots of trees, in wet woods, near Montgomery, Alabama. — Very near the European L. nervosa, but a more flaccid plant, its leaves more spreading, not so recurved on the margins, nor so attenuated at the point; the costa extending higher up; capsule not cylindrical; peristome smaller and lighter-colored, the interior more imperfect; and mainly the inflorescence different.

4. **L. rostràta,** Hedw. Diœcious; branches erect, crowded, fasciculate, terete; leaves closely imbricating, ovate-lanceolate, long and slenderly acuminate, papillose on both surfaces, the margins broadly recurved below; costa pellucid, vanishing below the apex; capsule oval-oblong; operculum rostrate. — Woods, in dense and extensive mats, on the base of trees: frequent. (Eu.)

5. **L.? denticulàta,** Sulliv. Diœcious; branches ascending, crowded, somewhat compressed; leaves closely imbricating, slightly secund, concave, ovate, suddenly and rather long acuminate, denticulate, ecostate; areolation oval; capsule oblong; operculum obliquely rostrate. (Musc. Alleghan., No 62.) — Base of trees; not uncommon in the Western States: fruit very rare, found only in Southern Alleghany specimens. — A small species.

### 67. CLASMÁTODON, Hook. & Wils. (Tab. 19.)

Calyptra cuculliform. Operculum conic-rostellate. Capsule oval, erect, pedicellate. Peristome single: teeth 16, short, 1–2-divided into irregular segments, remotely articulated. Annulus large, imperfect, somewhat persistent. Spores large. Inflorescence monœcious. — Very small species, with creeping, entangled, irregularly branched stems, and broadly ovate-acuminate semi-costate leaves, of an oval-elliptical areolation. — (Name from *κλάσμα, a fragment*, and *ὀδών, tooth*, descriptive of the peristome.)

1. **C. párvulus,** (Hampe,) Hook. & Wils. Leaves concave, patent, reflexed on the margins below, acute or obtuse; areolation of the basal angles quadrate; mouth of the capsule small; operculum variable in the length of the rostrum. — (Pterigonium marginatum, *Schweinitz* (not *Michaux*). Leskea parvula, *Hampe.* L. Sullivantii, *Bryol. Europ.?* Anisodon tenuirostris, *Bryol. Europ.* Clasmatodon pusillus, *Hook. & Wils.*) — On the bark of trees, in dry places, or on their roots in localities subject to inundations: very common in the Southern States. — A variable species. (Tab. 19.)

## Tribe XXVIII. THELIÈÆ.

### 68. THÈLIA, Sulliv.

Calyptra cuculliform, narrow. Operculum conic, rostrate. Capsule ovate-cylindrical, erect, pedicellate. Peristome double; the exterior 16 long, linear-subulate, white, granulated, distantly articulated teeth; the interior a carinate membrane extending to ½ the length of the teeth, with or without rudimentary cilia. — Growing in compact glaucous- or yellowish-green mats; stems villous, with a radicular tomentum, creeping, throwing up densely crowded short and terete branches, clothed with deeply concave closely imbricating deltoid-ovate slenderly pointed leaves, composed of pellucid elliptical and conspicuously uni-papillate cellules. (Name from *θηλή, a papilla*, referring to the prominent papillæ of the leaf.)

1. **T. hirtélla,** (Hedw.) Sulliv. — Leaves inclining to a dark yellowish-green, obsoletely semi-costate, ciliate-dentate on the margins, strongly papillose on the back, the papillæ elongated, curved, simple; perichætial leaves fringed. (Pterigynandrum hirtellum, *Hedw.*) — Roots and trunks of trees in woods; common.

2. **T. asprélla,** (Schimp.) Sulliv. — Growing with No. 1, formerly confounded with it; distinguished by the glaucous-green color of its leaves, their papillæ 2-lobed at the apex; and by the narrower, longer, and nodose teeth of the peristome, and smaller sporules. — (Leskea asprella, *W. P. Sch.*) — Northern and Middle States, and westward.

3. **T. Lescùrii.** Sulliv. (Musc. Bor.-Amer., No. 249.) Near the last species; ramification more fasciculate, not so condensed; the branches longer; leaves glaucous-green, with a bluish tinge, shorter, broader, not so acuminate, the areolation much smaller, not so pellucid, the papillæ 3-lobed at the apex; pedicel twice as long; capsule longer, often slightly curved, the mouth with a

broad reddish rim; teeth of the peristome not nodose; inner peristome better developed, the short carinate cilia quite evident; perichætial leaves yellowish. — Dry, sandy and hilly ground, in thin woods, never on trees. — Southern States, *Lesquereux*.

### 69. MYURÉLLA, Bryol. Europ. (Tab. 19.)

Calyptra cuculliform, narrow. Operculum convex-conic, obtuse, large. Capsule oval or obovate-oval, with a short and tumid erect collum, pedicellate, annulate. Peristome large, constructed as in Hypnum; the ciliolæ, however, very short, often absent. Inflorescence dicœcious. — Small, subalpine, glaucous green, densely tufted species; with erect, sparingly divided, julaceous, stoloniferous stems; and closely imbricating, subrotund, ecostate, more or less papillose leaves, composed of pellucid rhombic cellules.

1. **M. Careyàna,** Sulliv. Stems slender, branched by innovations, leaves very concave, with a short filiform point, strongly papillose on the back, and ciliate-dentate on the margins; perichætia orange-red, leaves smooth, narrowly lanceolate, filiformly acuminate, the margins at the upper end of the lamina fringed. — High mountain-tops, New England, *J. Carey:* Pennsylvania, *Lesquereux:* North Carolina (Negro Mountain), *Gray & Sullivant.* — The two other species of this genus, M. julacea and M. apiculata, were collected in British America by *Drummond.* (Tab. 19.)

## Tribe XXIX. FABRONIÈÆ.

### 70. FABRÒNIA, Raddi. (Tab. 18.)

Calyptra cuculliform. Operculum conic, acuminate. Capsule pyriform, erect, pedicellate; its mouth wide. Peristome single (in No. 4 absent); the exterior 16 linear-lanceolate teeth approximated in pairs, when dry reflexed. Inflorescence monœcious. — Minute species, uniform in habit and size, with prostrate stems, and erect crowded subfasciculate branches; leaves shining, ovate-lanceolate, filiformly acuminate, dentate or ciliate, semi-costate; the areolation lax, pellucid, the cellules at the basal angles quadrate, elsewhere larger and rhomboidal, with conspicuous primordial utricles: reticulation of the capsule-wall quadrate, flexuous. (Named after *Fabroni*, an Italian botanist.)

1. **F. Wrightii,** Sulliv. (Musc. Bor.-Amer., No. 251.) Capsule oblong-pyriform; operculum conic-rostellate; teeth of the peristome light golden-yellow; the vaginula concealed by the gradually acuminated perichætial leaves. — San Marcos, Texas, *Wright.* — Near the European F. octoblepharis; but that species has a mamellate operculum, dark brownish-red peristomial teeth, leaves with more numerous quadrate alar cellules, and an emergent vaginula.

2. **F. Ravenélii,** Sulliv. (Musc. Bor.-Amer., No. 252.) Leaves of a clear deep-green color, closely imbricating, entire on the margins, or occasionally with a few teeth; costa distinct, extending beyond the middle; perichætial leaves numerous, dentate, gradually acuminate; vaginula as in No. 1; teeth of the peristome rather short, dusky yellow; sporules large. — On dry rocks, South Carolina, *Ravenel.* (Tab. 18.)

3. **F. Caroliniàna,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 253.) Capsule, operculum, peristome, and perichætium nearly as in the last species; leaves yellowish-green, dentate on the margin, with a less conspicuous costa; sporules smaller. — On decayed logs, near the Santee Canal, South Carolina, *Ravenel.*

4 **F. gymnóstoma,** Sulliv. & Lesqx. (Musc. Bor.-Amer., No. 254.) Leaves whitish-green, elliptical-lanceolate, dentate-ciliate; costa reaching halfway or obsolete; perichætial leaves few, short, obovate, suddenly subulate-acuminate; capsule broad-oval, shortly apophysated; peristome none. — Santa Fé, New Mexico, *Fendler.*

### 71. ANACÁMPTODON, Brid. (Tab. 18.)

Calyptra conic-cuculliform. Operculum conic-subrostellate. Capsule oval, erect, pedicellate. Peristome double; the exterior 16 narrowly lanceolate teeth smooth on both surfaces, approximated in pairs, when dry reflexed (hence the name); the interior 16 slender cilia, without a basilar membrane. Inflorescence monœcious. — Low, cæspitose, with irregularly branched stems, and spreading ovate-lanceolate semi-costate leaves, of a rather loose and pellucid rhombic areolation. (Name from *ἀνακάμπτω, to bend back,* and *ὀδών, a tooth.*)

1. **A. splachnoìdes,** Brid. Cilia of the inner peristome always erect, capsule when dry much constricted below the mouth; foliage deep green. — In the forks and open hollow knots of partly decayed trees: rare, though its range is extensive. (Tab. 18.) (Eu.)

## Tribe XXX. PYLAISÆÈÆ.

### 72. PYLAÌSÆA, Bryol. Europ. (Tab. 18.)

Calyptra cuculliform, rostrate. Operculum conic, more or less rostellate. Capsule oblong, erect, pedicellate. Annulus narrow, simple. Peristome double: the exterior 16 linear-lanceolate teeth inserted below the mouth of the capsule; the interior as in Leskea, but with the cilia more or less ruptured along their keel, or a membrane adherent to and bordering the teeth; ciliolæ rudimentary or none. Inflorescence monœcious: male flower gemmiform, axillary. — Small species, fruiting abundantly, with glossy, concave, elongated, closely linear-areolated and ecostate leaves; their alar cellules numerous, small, quadrate, and opaque. (Named for *B. de la Pylaie,* a French botanist.)

1. **P. denticulàta,** W. P. Sch. Grows in closely entangled mats; branches crowded, short, ascending; leaves lanceolate, acuminate, slightly denticulate at the apex; capsule oblong-cylindrical; pedicels 3″–5″ high; operculum with a rostrum about as long as the conic base; inner peristome firm, yellow, much as in Leskea, the cilia or processes often split along the keel, the basilar membrane broad; sporules bright yellow, smooth, about $\frac{1}{500}$ of a line in diameter. — Bark of trees, Columbus, Ohio; very rare.

2. **P. intricàta,** Bryol. Europ. Size and mode of growth much as in the last; branches short, recurved; leaves ovate-lanceolate, acuminate, nearly

entire, more or less secund; capsule oval or ovate-oblong, its mouth small; pedicels 5″–7″ high; operculum conic, scarcely rostellate; inner peristome a granulated grayish membrane, adherent to and bordering the lower half of each tooth, free above, and split into two linear-lanceolate divergent segments, as in Bartramia; sporules light greenish-yellow, their diameter one half greater than in No. 1. — (Pterigynandrum intricatum, *Hedw.*) — Trees and logs; common. (Tab. 18.)

3. **P. velutìna,** W. P. Sch. Exceedingly like and formerly confounded with No. 2; leaves with fewer quadrate alar cells; capsule cylindrical, its mouth larger; operculum decidedly rostellate; teeth of the peristome more closely articulated, narrowly bordered their whole length by the adherent inner peristome; sporules dark yellowish-green, granulated, with a diameter twice as great as in the first species. — Bark of trees, Columbus, Ohio.

(P. POLYÁNTHA, a common European species, and found in British America by Drummond, has the peristome of No. 1, with the capsule and short-conic operculum of No. 2.)

## 73. HOMALOTHÈCIUM, Bryol. Europ. (partly.) (Tab. 19.)

Calyptra cuculliform, hairy. Operculum conic, subrostellate. Capsule ovate-cylindrical, regular and erect, or oblique and incurved, pedicellate, annulate. Peristome double; the exterior 16 linear-lanceolate teeth, with close articulations conspicuous on the margins; the interior 16 short cilia from a plicate base; or a membrane lining the teeth. Inflorescence monœcious or diœcious. — Stems prostrate, closely and pinnately branched; leaves shining, costate, serrulate, with an oblong-rhomboidal areolation. — (Name from *ὁμαλός, equal,* and *θήκη, a capsule;* applicable to the type of the genus, Leskea sericea, *Hedw.*)

1. **H. subcapillàtum,** Bryol. Europ. Monœcious; leaves elliptical or obovate-elliptical, suddenly acuminated, not striate, serrulate; costa single or forked, extending half-way; pedicel rough; capsule inclined, slightly incurved; teeth of the peristome dark-red, with a broad pellucid central stripe marked by a delicate zigzag medial line; inner peristome a membrane lining the teeth. — (Pterigonium ascendens, *Schwœgr. Suppl. t.* 243. Pt. decumbens, *Schwœgr. l. c. t.* 110. Pterigynandrum brachycladon, *Brid. Bryol. Univ.* 2. *p.* 185.) — A small species resembling Pylaisæa intricata, and growing with it on trees: common. (Tab. V.)

## 74. PLATYGÝRIUM, Bryol. Europ. (Tab. 19.)

Calyptra cuculliform, elongated, slightly spiral. Operculum conic, short-rostrate. Capsule oval-oblong, erect, pedicellate. Peristome double; the exterior 16 linear-lanceolate broadly margined teeth; the interior 16 filiform cilia, the basilar membrane obsolete. Annulus very large. Inflorescence diœcious. — Rather small species, with prostrate closely entangled subpinnate stems; and oblong-lanceolate ecostate leaves, with a linear areolation. — (Name composed of *πλατύς, large,* and *γυρός, ring,* referring to the annulus.)

1. **P. rèpens,** Bryol. Europ. Branches short, rather julaceous, ascend-

ing; pedicels 5′ – 6″ high; leaves reflexed on the margins. — (Neckera brachyclada, *Mull. Synop.* 2. *p.* 88.) — Old fences, logs, &c., forming dense brownish-yellow patches. Fruits abundantly. (Tab. 19.) (Eu.)

## Tribe XXXI. CYLINDROTHECIÈÆ.

### 75. CYLINDROTHÈCIUM, Bryol. Europ. (Tab. 19.)

Calyptra dimidiate, narrow, elongated. Operculum conic-rostellate. Capsule cylindrical, erect, pedicellate, annulate. Peristome double; the exterior 16 linear distantly articulated teeth; the interior 16 narrow carinate cilia, connected at the base by a very narrow membrane. Columella usually exserted. Inflorescence monœcious. — A very natural genus, with prostrate and usually compressed stems, and closely imbricating ecostate polished leaves, with a minute linear transparent areolation. (Name from *κύλινδρος, a cylinder*, and *θήκη, a little case*, referring to the shape of the capsule.)

* *Pedicels reddish.*

1. **C. cladorrhìzans,** Bryol. Europ. Stems 2′–3′ long; sparingly and subpinnately branched; leaves oblong-ovate, acute, slightly serrulate at the apex, concave, indistinctly bicostate at the base; operculum conic, with a thick obtuse rostrum. — Woods, on old bogs, in large mats. Conspicuous by the broad flat branches, and greenish-yellow foliage, dashed with bright brown; very common. (Tab. 19.) (Eu.)

2. **C. sedúctrix,** Bryol. Europ. Separated from No. 1 by its less compressed, almost cylindrical stems and branches. (Fruits much more abundantly, and affects humid situations.) — Margins of swamps, on old logs and roots of trees. — Its numerous dark-red pedicels give it a striking character.

3. **C. compréssum,** Bryol. Europ. Near No. 1, but distinguished by its smaller size; more compressed branches; the leaves loosely imbricating, more concave, with an obtuse entire apex, and a more lax areolation; shorter ovate-oval capsule; and substriate perichætial leaves. — (Leskea compressa, *Hedw.*) — Trunks of trees, on river-banks, subject to inundation, Central Ohio: rare.

4. **C. Sullivántii,** (C. Mull.) Bryol. Europ. A more slender species than any of the preceding; stems and branches elongated, narrow, and quite flat; leaves laxly imbricating, oblong-ovate, short-pointed; annulus conspicuous; operculum with a slender acute rostrum. — (Neckera Sullivantii, *Mull. Synop.* 2. *p.* 65, 1850. C. gracilescens, *W. P. Schimper, Bryol. Europ. fasc.* 46, 47, 1851.) — On stones, near the surface of the ground; banks of the French Broad River, North Carolina.

* * *Pedicels yellowish.*

5. **C. Drummóndii,** W. P. Sch. About the size of No. 1, which it much resembles; but its stems and branches are more complanate; leaves not so closely imbricating; teeth of the peristome perforated along the medial line, more distantly articulated; sporules half the size; annulus nearly obsolete. — (N. cladorrhizans, *Hook. & Wils. in Drum. 2d coll. No.* 96 C. Rugelianum, *W. P. Sch.?*) — North Carolina, *Ravenel:* Texas, *Wright.*

6. **C. brevisètum,** Bryol. Europ. Ramification subfasciculate; branches nearly terete, acuminate; leaves crowded, ovate and oblong-ovate, the point extended and subserrulate, the margins slightly reflexed; annulus large; inner peristome abortive, or a membrane lining the teeth. — Dry places, on trees, &c., Western and Southern States; not common. Fruits sparingly.

## Tribe XXXII. NECKÈREÆ.

### 76. NÉCKERA, Hedw.; Bryol. Europ. (Tab. 19.)

Calyptra cuculliform. Operculum conic, rostellate. Capsule oval, erect, pedicellate, immersed or exserted. Peristome double; the exterior 16 long linear-acuminate teeth; the interior 16 subulate cilia, more or less developed, the basilar membrane very narrow. Inflorescence monœcious or dicœcious. — Rather large species, conspicuous for their flat broad stems, and shining, complanate, ovate-lanceolate, scarcely costate, and mostly transversely undulate leaves, of a thin, smooth texture, and a minute elongated-rhomboidal areolation. (Named for *N. J. Necker.*)

1. **N. pennàta,** Hedw. Monœcious; branchlets obtuse; leaves acuminate; capsule immersed in the long perichætial leaves; cilia of the inner peristome obsolete or rudimentary. — Trunks of trees; common in mountainous districts. (Tab. 19.) (Eu.)

2. **N. complanàta,** Bryol. Europ. Dicœcious; branches often attenuated, flagelliform; leaves ovate-oblong, obtuse, apiculate, not undulate; capsule long-pedicelled, exserted; peristome with cilia half as long as the teeth. — (Leskea complanata, *Hedw.*) — On rocks, New England, Alleghany Mountains, and Tennessee. (Eu.)

### 77. OMÁLIA, (Brid.) Bryol. Europ. (Tab. 19.)

Calyptra cuculliform. Operculum conic, rostellate. Capsule oblong, erect, or slightly cernuous, pedicellate. Peristome as in Hypnum. Inflorescence monœcious. — Ramification irregular; stems and branches flat, interruptedly leafy; leaves complanate, ovate-oblong, semi-costate, obtuse, apiculate, shining, with a minute rhombic areolation. (Name from ὁμαλός, *flat*, referring to the stems and branches.) (Tab. 19.)

1. **O. trichomanoìdes,** (Brid.) Bryol. Europ. Main branches ascending, arcuate-incurved, irregularly ramulose; leaves often somewhat falciform, lax, pale-green, serrulate above; capsule oval-oblong; ciliolæ of the inner peristome rudimentary or absent. — On rocks, about Lake Superior, but rare, *Drummond.* (Eu.)

2. **O. Jamesiàna,** W. P. Sch. mss. Found by Mr. Thomas P. James on the White Mountains, New Hampshire, and on the Catskill Mountains, New York. — (Hypnum trichomanoides, *James, Enum.*) — We have seen no description of this species, and our specimens are too imperfect (being without fruit) to exhibit the distinctive characters.

3. **O.? Wrightii,** Sulliv. (Musc. Bor.-Amer. No. 269.) Stems pros-